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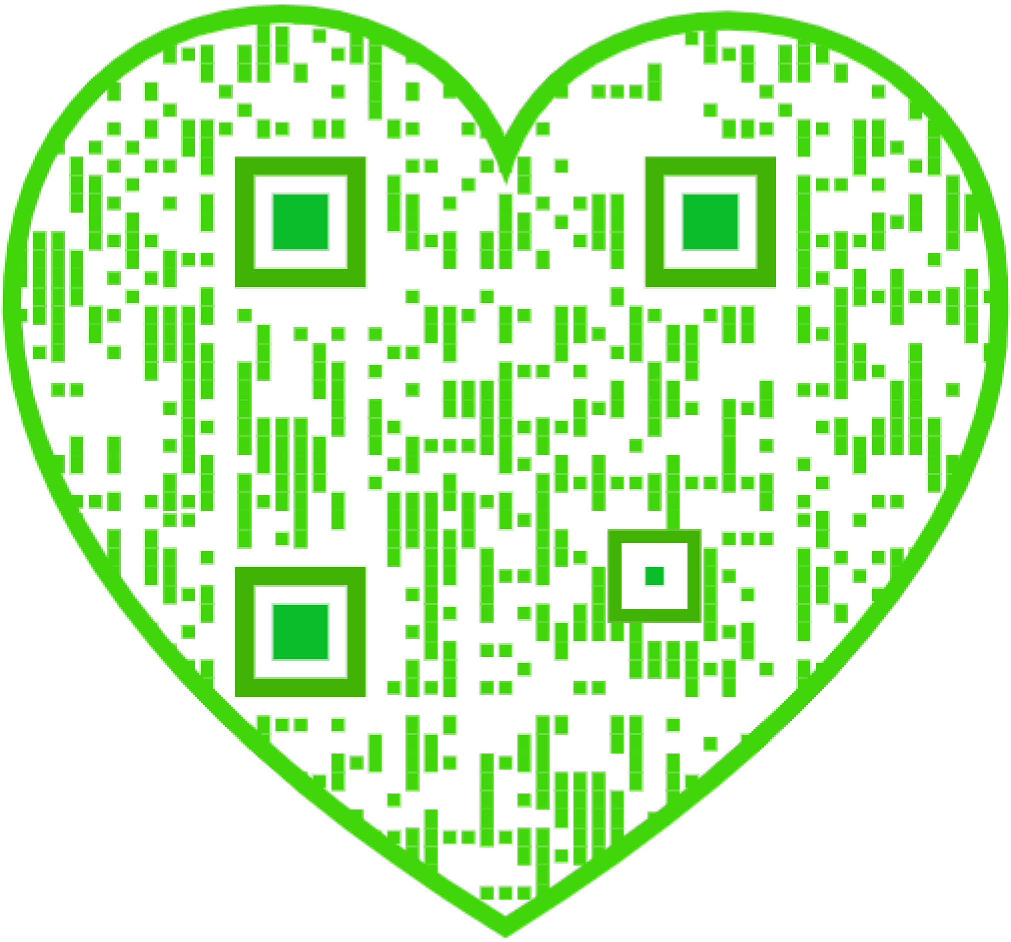

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MX-5 club

Our next project car is the Mazda MX-5 Mk3, known as the NC model. All the MX-5 generations have a huge fan base following – the Mk1 arrived here 36 years ago and today good examples command high prices in the classifieds.

We did cover a Mk1 NA model as a project car in 2008 (you may remember). It was 12 years old at the time and the Mk3 car I've just bought here has driven 102,000 miles in 14 years on British roads.

CM contributor, Rob Hawkins, has owned a Mk2 NB model for many years. It's a driver's car with rear-wheel-drive and great roadholding. Owners Clubs cater for all the MX-5 various models/special editions throughout the decades – with the arrival of the 2015 Mk4 ND model still being sold today.

On my second trip out in our 2010 car, I happened to notice a NB car travelling in the opposite direction. I wasn't prepared for the friendly wave from the driver as we passed each other. There's something about these cars that brings petrolheads together.

Visiting my local MX-5 specialist/restorer on a Saturday morning, I could see other owners arriving – ready to spend cash on their pride and joy. On one of MX5 Restorer's ramps sat a 2006 NC model. Rear sections of rust had been cut from the sills and arches with new fabricated metal being welding in. The engine apparently had thousands spent on it too. Some owners get attached to their cars and want them looking and running in tip-top condition – even if they are 20+ years old.

And why not – what's not to like? They drive great, the roof comes down when required and there's a friendly atmosphere amongst other MX-5 owners.

The only problem is... they aren't for everyone – two seats and a small boot might put you off owning one.

Stick the MX-5 in the sun with this Stormy Blue Mica paint and the metallic fleck will bring the colour to life. It looks stunning!

Electronic Diagnostics Volume 4

This 100-page book is printed from previously published articles in *Car Mechanics* with seventeen makes/models manufactured from various years. Volume 5 will arrive this time next year.

On sale now at WHSmith stores and online. This book was also attached to this magazine as a bundle deal (priced at £10.99). If you missed that, then the book is available in the shops, or online at the web address below.

Priced at **£9.99** or a digital copy at **£8.99** direct from https://shop.kelsey.co.uk/car-mechanics-expert-magazine

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Following on from my request to send in your cars for sale/parts for sale and wanted, I'd like to thank those that took the time to send in emails to me. As you can see on page 96, the *Free Ads* section looks full with about 80% of the adverts from genuine *CM* readers as opposed to 80% in the March 2025 issue picked from other magazines in the Kelsey Publishing portfolio.

To get the most from selling car parts, there's now another outlet source I'd like to introduce to you. If you turn to page 70, the *Help!* section, you'll see a new sponsor. **ifndautoparts** is sponsoring our Q&A pages for the next 12 months.

ifndautoparts is a new concept in selling automotive parts. They need your help to populate their website, so look around to see if you have any car parts you could sell on to someone else.

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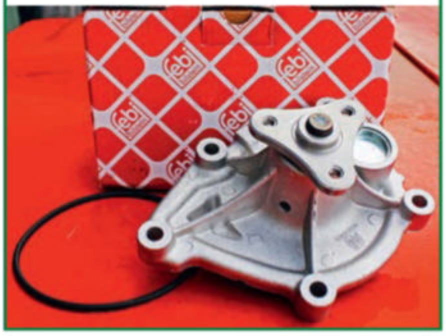
You can also search for parts – either by part number or make/model, variant, etc. There's an area where you can create a 'garage' – build a list of your own cars for easier reference each time you log-in. You can search globally or just in the UK for specific parts.



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We are sorry, but apart from material sent to *Help!* or *Diagnostics Doctor*, not all correspondence can be replied to personally, though everything is read carefully. Emails will be treated in the same way as ordinary mail – the editor is not normally available to provide instant replies.

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The Peter Simpson COLUMN

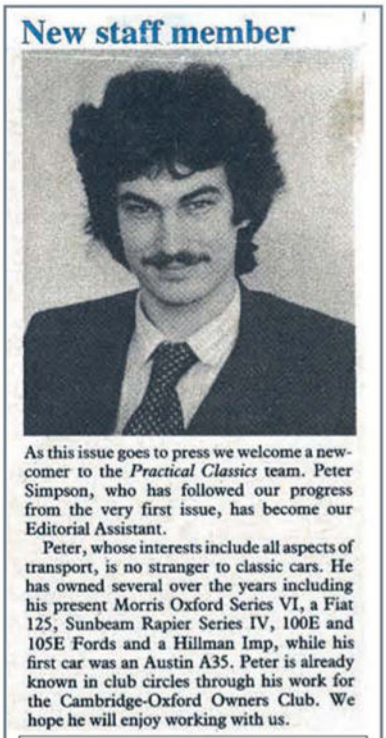
This month Peter celebrates a significant personal anniversary.

▶ This issue's April 2025 cover date is rather significant for me. It marks my 40th anniversary as a motoring journalist. I still can't really believe that, but the mathematics aren't lying, and just before 9am on April 9th 1985, I presented myself at the editorial offices of *Practical Classics*. This came after five years of teacher training, followed by ten weeks as probably the worst schoolteacher in the entire history of education.

At this time *Practical Classics* was independently owned and published. The offices were above an insurance broker in Rectory Road, Beckenham, just opposite Beckenham Junction railway station. I'd read PC since the first issue, so felt that I 'knew' already the principal people involved – Editor John Williams, former and senior Editor Michael Brisby (who had moved over to The Automobile a couple of years earlier) and Paul Skilleter, our editorial director and the guy whose idea it was to produce a DIY magazine for classic car owners. Paul was already a well-known Jaguar expert and came up with the idea for *Practical Classics* while working as staff photographer on *Classic Cars* magazine.

Paul was one of three directors whose initials formed the name of the publishing company PPG Publishing. The others were Peter Hart (owner of Brooklands Books) who headed up the advertisement sales department and Gordon Wright who ran Raven Studios, one of South London's largest design and pre-print businesses. Gordon was thus the ideal person to put everything together and get it to print. Gordon was also the most experienced businessman of the trio and as also the only director based permanently in Beckenham, he was also our *de facto* managing director.

Since then, apart from six years with EMAP after *Practical Classics* was sold in 1989, I've worked for essentially the same company ever since. After the sale of *Practical Classics*, PPG sort-of evolved into Kelsey Publishing, owned and run by Gordon. That name, incidentally, came from the businesses first base, Kelsey House in Beckenham High Street. This was a significant five-storey office block in the middle of town, and with the name 'Kelsey House' emblazoned down the side. Kelsey Publishing rented just one floor of this when it started. However, Gordon reckoned that if the business was called Kelsey Publishing it would appear to the casual observer as though 'Kelsey Publishing' was much bigger than this – big enough, in fact, to own and occupy all of Kelsey House! In time, Kelsey took the third floor as well as the 4th, but that was as far as we got before moving out to rural Cudham.



New staff member

As this issue goes to press we welcome a newcomer to the *Practical Classics* team. Peter Simpson, who has followed our progress from the very first issue, has become our Editorial Assistant.

Peter, whose interests include all aspects of transport, is no stranger to classic cars. He has owned several over the years including his present Morris Oxford Series VI, a Fiat 125, Sunbeam Rapier Series IV, 100E and 105E Fords and a Hillman Imp, while his first car was an Austin A35. Peter is already known in club circles through his work for the Cambridge-Oxford Owners Club. We hope he will enjoy working with us.

Introduction from the June 1985 issue of *Practical Classics* featuring my 'Jason King' look. The wearing of a suit and tie lasted just three days.

Eventually, Kelsey employed pretty-much everyone who had worked for PPG. I was the only ex-PPG employee to relocate when, 18 months after the sale, and despite promising that it would never happen, EMAP moved the title to Peterborough. My five years there weren't, however, especially satisfactory for, I suspect, either party, so when the opportunity to 'return', as Editor of *Car Mechanics* magazine arose, I jumped at it.

In some respects, working for the same company for 34 years may sound like the ultimate in being unadventurous. But looking back over that time, the job has changed and evolved so much that it really is akin to a different job. I missed by a couple of years the days of hot metal typesetting but still used an old-school typewriter for the first couple of years until that was replaced by an Amstrad computer. The principal benefit of this however was that it made writing much easier; everything was still printed out and handed to 'typesetters' who rekeyed it all into their systems.

Most of the magazine was also still printed in black and white, and photos being used in black and white were taken and processed in black and white.

The other big difference was that back then everyone was office-based; the remote working that's normal in publishing now, with Editors and designers based hundreds of miles apart, would have been completely inconceivable.

But it wasn't just the way in which we produced the magazines that was different; the cars were too. Except that, as far as *Practical Classics* was concerned, many of the actual cars weren't different. The first issue I was involved with had a Mk1 Mini buying guide, Riley One Point Five restoration story, Ford Anglia 105E engine overhaul and my first-ever news story was a report on the Ford Classic & Capri Owners Club's annual rally. Project cars included a 1950s Series 1 Land Rover.

But though the cars themselves weren't different, their age certainly was – back then these typical classics of the era were on average only about 20 years old.

But *Car Mechanics* isn't a classic car magazine, and when it comes to contemporary transport, the world of cars has changed beyond recognition. Since 1985, diesel cars have become popular and, almost as quickly, fallen out of favour. Electric is of course on the ascendancy. There was interest in this back in 1985, but the size and weight of batteries needed for propulsion was preventing it getting much beyond short run and slow speed operation. When it comes to petrol engines, today's engines are much more powerful and efficient and have much longer service lives than their 1985 counterparts. In part, all this is down to better-quality fuels and lubricants, but the main change is much better electronic-based engine management.

We were seeing the first signs of this back in 1985 – who else recalls the Maestros and Montegos with SU carburettors that were controlled electronically? But it was to be another ten years before SU's final fit-on-the-production-line carburettors were made. I know, I was there when it happened!

Forty years is certainly a long time – getting on for half a typical lifetime in fact. But I still love the job, and while it hasn't all been total plain-sailing, I can't really imagine anything else being as much fun and providing the same fulfilment as writing about vehicles. I also hope to carry on doing it for a few years yet.

Thank you to everyone who has made it all possible – it's been good.

Follow Rob on X: **#CarTechJourno**

Clutches

Being such a major repair task, **Rob Marshall** looks at the processes involved with diagnosing and replacing modern clutches.

While it is true that manual gearbox sales are declining, not helped by some car models forgoing a traditional H-patterned gearshift altogether, you may be surprised that clutch replacement services are growing.

"One reason for this is that clutches are not just the preserve of manual gearboxes, they are used on various semi-automatic/automated-manuals, too", reports Amrik Singh, Director of the West Midland-based A1 Clutches.

While traditional planetary-gearset automatics forgo a friction clutch in favour of a torque-converter, single and dual clutch (2CT) transmissions tend to feature dry clutch packs.

Mr Singh advises that 2CT clutches, especially, require special knowledge, tools, training and techniques to install. Therefore, we have excluded them from this feature but our February 2022 issue contains more details. In his thirty-five years of being in the clutch-replacement business, he reveals that conventional clutches might look very similar to those fitted to cars now considered classics but development has not stood still.

Many changes remain unseen. Modern clutches have to tolerate increased engine torque, higher vehicle weight, lighter construction and more environmentally friendly friction materials. Further developments have included the need for clutch pedal weight to not only be minimised but also remain relatively unchanged, throughout the clutch's life. Extra complications, introduced by car manufacturers to increase refinement, reduce CO2 emissions and curb production/running costs, are further reasons why modern clutches tend not to last as long as those fitted to their forebears.

The replacement proposition

A traditional problem with replacing clutches is that it is heavy, laborious work, tending to dictate significant dismantling to even access the three-piece assembly.

"This situation has become much more complicated," reports Mr Singh, who highlights that not only do more parts tend to be in the way but also subframes, or even steering racks, might need removing. This may make a clutch replacement difficult, or even dangerous, without a ramp and/or transmission support stands. Mr Singh warns that you also risk damaging components, especially the new clutch, by working in less-than-ideal circumstances.

Even so, some clutches are easier to replace than others. While the following overview looks at one of the simplest and easiest modern clutch changes, we advise that you research how involved the task is on your car, before starting work.

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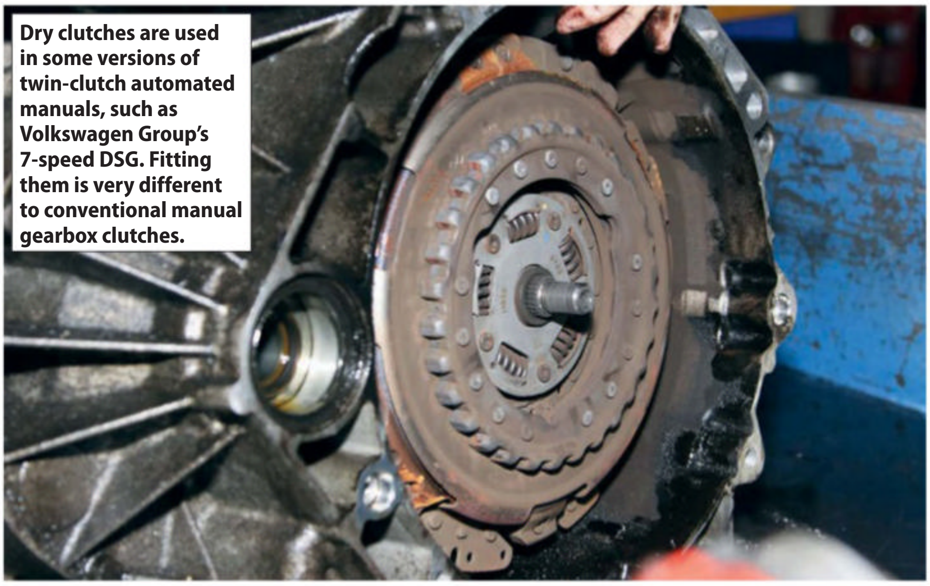
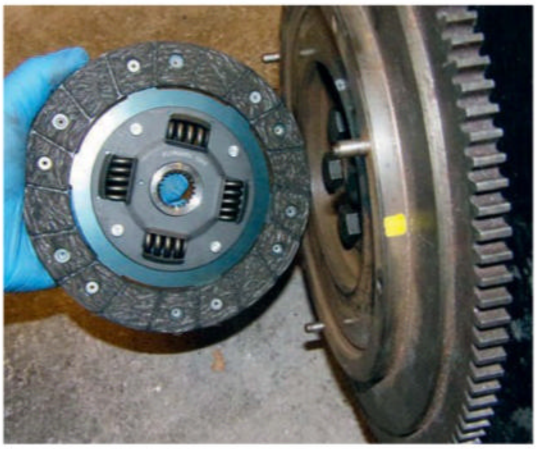
Clutch changes remain popular but they have become no easier.

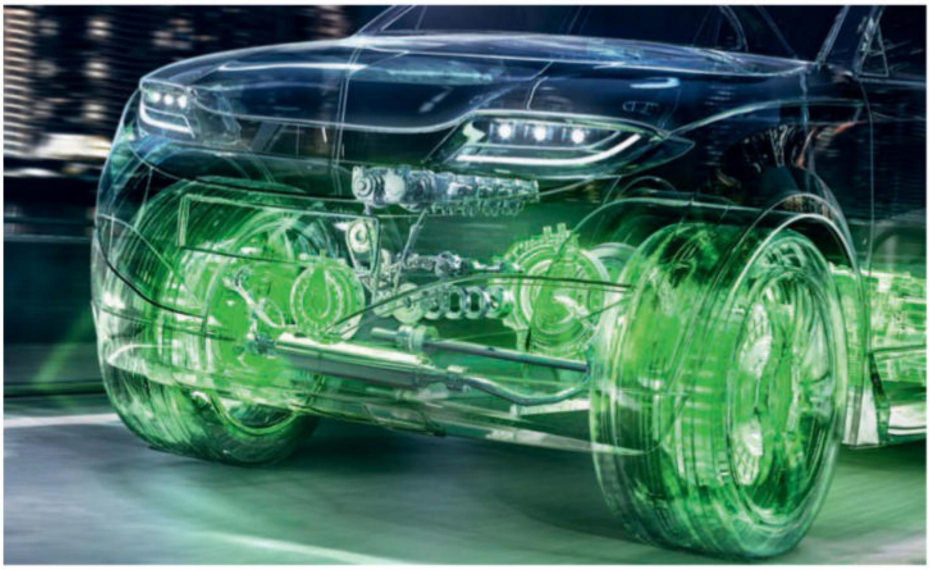


Dry clutches are used in some versions of twin-clutch automated manuals, such as Volkswagen Group's 7-speed DSG. Fitting them is very different to conventional manual gearbox clutches.

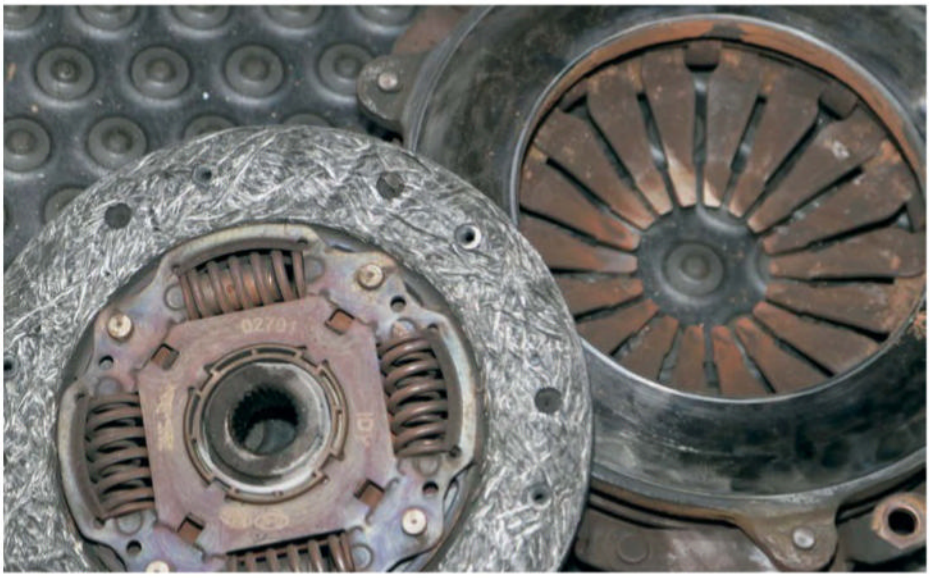
A1 Clutches COMMON clutch fitting errors

- **OVER-GREASING**
  Excessive, or incorrect, grease on the input shaft/drive plate splines contaminates the friction material, causing slip soon afterwards.
- **MALALIGNMENT**
  Align the spines correctly with the driven plate during gearbox installation. Use a suitable alignment tool, if possible.
- **SUPPORT NEEDED**
  Allowing the input shaft to take the transmission's weight tends to distort the clutch drive plate, at least.
- **GET IT THE RIGHT WAY ROUND**
  Even some professionals fit the drive plate the wrong way round. Check the markings on the drive plate (as pictured).
- **INSPECT BEFORE FITTING**
  Inspect new clutches before installation; they can be damaged in transit.





Electrification does not mean the end of friction clutches. Plug-in Hybrid cars possess clutches, despite many people thinking of them as 'automatics'. For instance, a clutch switches drive between the combustion engine and electric motor. In some cases, it can look like a standard diaphragm spring clutch, operated by a conventional concentric slave cylinder, and controlled by an electronic hydraulic actuator.



Heat is your clutch's enemy. Consider that maximum clutch slip time should not exceed several seconds. Any more risks creating potentially damaging quantities of heat. Apart from the pungent smell, overheating changes the lining material's friction characteristics.

Most cars use hydraulics to operate the clutch, although some budget modern cars retain cables. Many possess automatic adjusters. Yet, some cars have manual adjustment facilities on the clutch operating arm (as pictured), to compensate for drive plate wear.

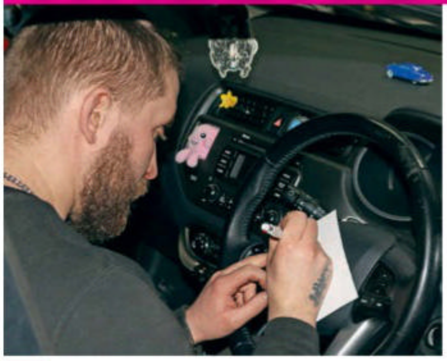
Making your clutch last longer

To ensure maximum life from a new clutch:

- **Avoid keeping the clutch at its biting point for more than several seconds** – otherwise, excessive heat can damage the release bearing, cover, drive plate and flywheel surfaces.
- **Avoid holding the clutch pedal down for long periods** – this damages the release bearing.
- **Prevent driving at too high a gear at low engine speeds** – This can damage the dual mass flywheel.
- **Avoid long idling periods, especially with the air-conditioning engaged** – Again, this damages the dual mass flywheel.
- **Prevent changing into a lower gear too early** – This can overspeed the drive plate.
- **Avoid spilling fluids onto the engine** – They can work their way onto the clutch drive plate, contaminating the lining.

⇨

TYPICAL FWD CLUTCH CHANGE



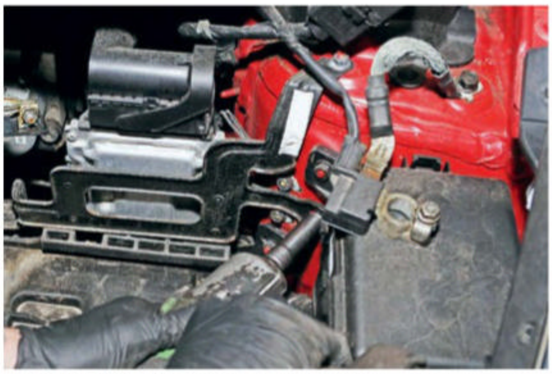
1 The vehicle is taken for a test drive, to assess the clutch mechanically. The technician records the mileage and verifies that the engine management lamp is extinguished. A slipping clutch can result in a fault being recorded, because of the mismatch that slipping can cause between the engine speed and wheel sensors.

2 This little Kia Rio is one of the easiest modern cars, on which to replace a clutch. A DIYer, therefore, might encounter no issues. Yet, consider that many modern cars tend to require extensive dismantling, or even the subframe/steering rack dropped, or removed. These tasks are extremely difficult, and potentially unsafe, to conduct without a ramp.

3 Work starts, by disconnecting the battery (negative lead first), prior to removing the plastic trim that surrounds the bonnet slam panel. It is retained by two button clips and a pair of 10mm bolts.

4 The air filter housing has to be disconnected from the ducting and lifted from the engine bay.

5 The battery is lifted out, after removing the single bolt and bracket.

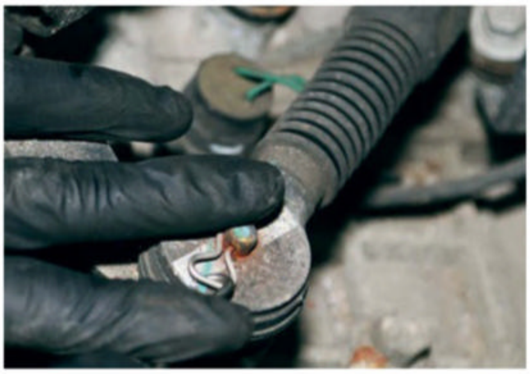


6 ◀ On this model, the engine ECU is positioned behind the battery. It does not need removing but it should be manipulated out of the immediate working area, by removing three 10mm nuts.

7 ▶ A further four 12mm bolts hold the battery tray to the inner wing. It can then be lifted from the engine compartment.

8 ◀ The wiring is secured to the body, by plastic clips that can be prised away, gently. Try not to break them. Manipulate the wiring so it does not get in the way, or become damaged. In many cases, universal cable ties will suffice as satisfactory clip replacements but be wary of causing any wires to chafe, when you reassemble the car.

9 ▶ Unhook the two gear shift cables from the transmission.



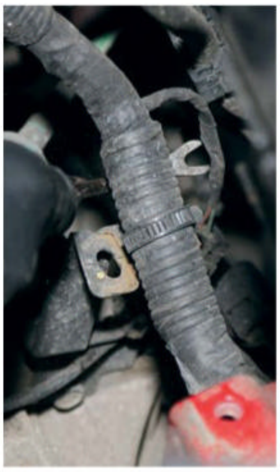
Dual Mass Flywheels

▶ Dual Mass Flywheels (DMFs) comprise a pair of flywheels ('masses') that are attached but move independently from each other. Their main purpose is to prevent torsional vibrations from being fed back into the cabin, especially with modern engines being tuned to produce more torque from lower engine speeds. This has helped manufacturers achieve fuel economy and CO_2 emissions targets, without causing the passengers discomfort. They also protect the transmission from damage.

Naturally, DMFs have become more sophisticated, since they were fitted first to BMW's economy-focussed 525e from 1984. Today, over half of all UK vehicles are fitted with one. For instance, modern Start-Stop cars possess an internal friction plate that lengthens the unit's lifespan, by restricting the internal arc springs' movement during engine start and shut-down. While DMFs tended to be fitted to popular diesel cars, many new-generation small-displacement petrol engines (especially three-cylinder units) possess DMFs as a cost-effective means of making them more refined.

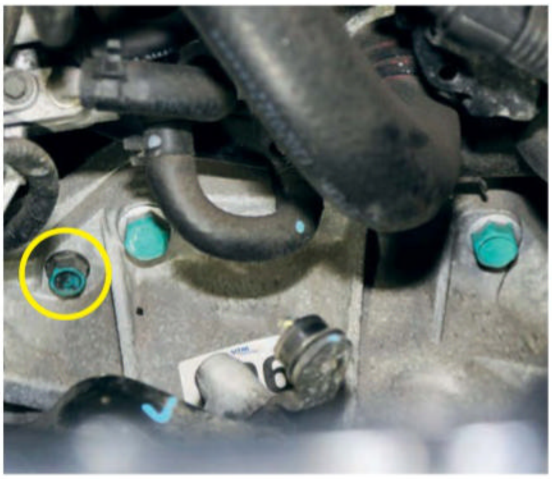
Being moving parts, DMFs cannot be as reliable as the relatively unsophisticated single mass flywheel, such as that fitted to our demonstration Kia. Clutch judder can be an early warning sign but rattling, or knocking, tend to be the main symptoms. Should you notice metal filings being attracted by the starter motor magnets, the DMF is likely in an advanced state of decay. Despite replacement DMFs becoming less costly, a temptation remains to fit solid flywheel conversion kits. This topic attracts considerable debate among clutch manufacturers. Even companies that supply clutches to car manufacturers have differing advice about whether they should be installed, or not.

A1 Clutches inspects every DMF. Even if there are no obvious signs, such as overheating, grease loss, or noise, it tests every DMF for wear, by measuring arc-spring movement and central bearing rock with special tools and comparing these figures with data for that particular car. It says that, in most cases, it replaces the DMF. The firm admits that it has fitted conversion kits but its decision is based largely on the model and its use. These tend to be cars that are subjected to extreme use, such as regular heavy-load towing, driving school cars, or engines that idle for long periods, such as emergency vehicles. The specialist says that there can be some driving compromises, such as a loss of refinement, and it advises every car owner to be aware of the potential pitfalls, before straying from the original specification.



10 ◀ **The gear cables possess a bracket, which is held in place by two 12mm bolts. It also supports a section of wiring loom, which should be dismounted as per Step 8.**

11 ▶ **Any plastic electrical mouldings can become brittle, due to repeated heat cycles from the engine, so this is considered, when the reverse lamp switch cabling is disconnected.**



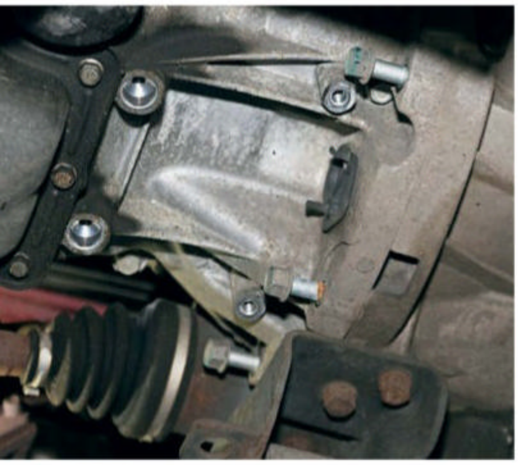
12 ◀ **As A1 clutches employs a ramp, the firm conducts the majority of work within the engine bay, first. Therefore, the top pair of bolts is removed, first. These secure the transmission bellhousing to the engine but the starter motor fixings are not touched, yet (circled).**

13 ▶ **Most cars require at least one front wheel to be removed, during a clutch change. Remember that a jack is designed to lift, not support. Therefore, several axle stands are vital, should a lifting ramp be unavailable.**

TYPICAL FWD CLUTCH CHANGE CONTINUED

14 With the car raised, A1 Clutches continues work from beneath. While most cars possess full plastic undertrays, this Kia Rio has a pair of front mouldings, each of which is secured by a single clip and four 10mm bolts. Any exposed steel fixings should have their threads greased, when refitting, to guard against corrosion and make them easier to unscrew next time.

15 As it tends to be neglected, A1 Clutches recommends replacing the gearbox oil. It is also less messy to do so at this stage. This Kia possesses a 17mm drain plug but some cars lack any kind of drain whatsoever, meaning oil spills out, when the driveshaft is removed. Old gear oil can be recycled at household recycling centres.



16 The bellhousing-to-engine bolts (pictured green) are hidden by a metal bracket that is held by four 12mm bolts.

17 Heeding the advice from Step 11, the speedometer's speed signal wire is uncoupled.

18 The offside driveshaft metal shield should be removed, by unscrewing the two 14mm bolts...

19 ... to facilitate access to the 14mm bellhousing bolt that is positioned, approximately, at the 9 o'clock position.

20 ◀ At this point, A1 Clutches loosens other 14mm securing bolts. As several of them remain tight, plus the gearbox's weight is supported by dowels, there is no risk of damaging the gearbox, by allowing its weight to be supported by the input shaft. Note that the crankshaft speed sensor is pictured being disconnected, too.

21 ▶ The driveshaft is removed, next. The central bolt tends to be very large (32mm) and tight. The correct socket is essential. Should you not have an impact wrench, unscrew it using an extension bar, with the car's weight on its wheels. Enquire if a replacement nut is necessary, because some types are designed not to be reused.

Continued on page 12

Your trade
Our tech

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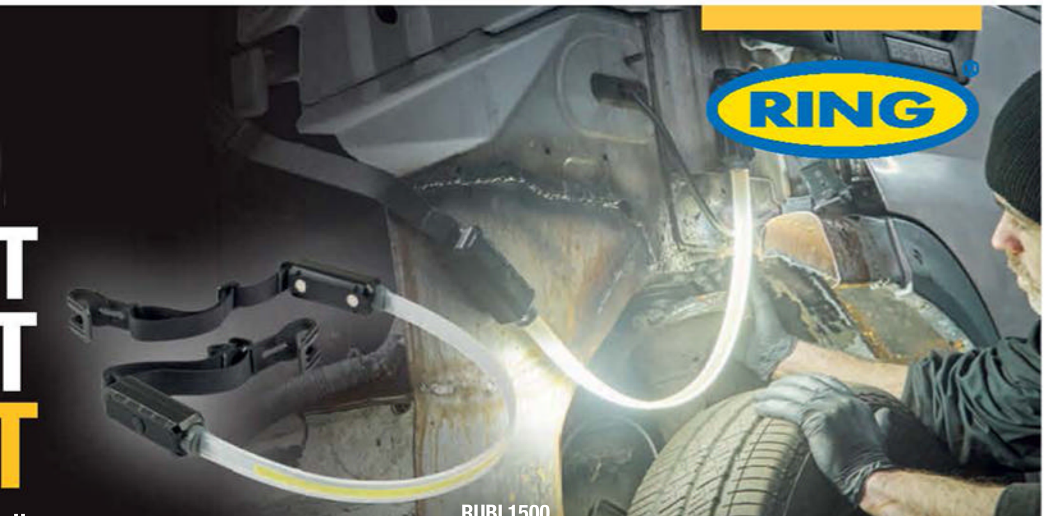

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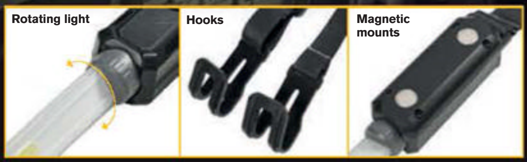

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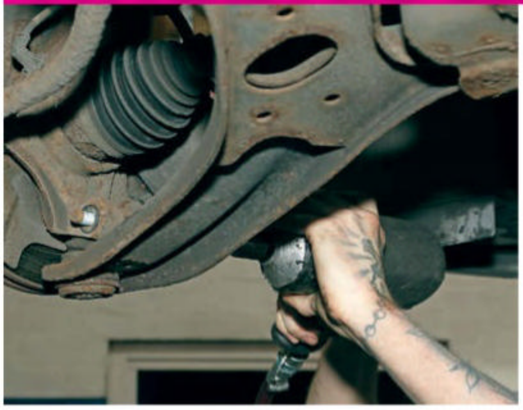
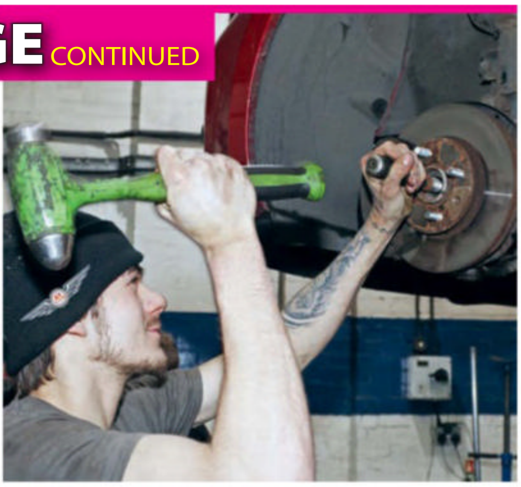
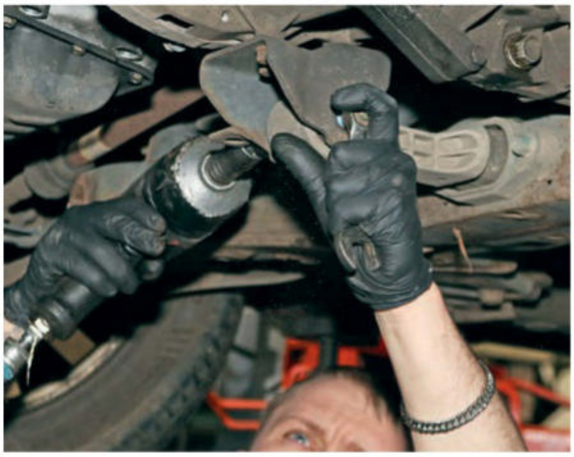
TYPICAL FWD CLUTCH CHANGE CONTINUED



22 ◀ So that the suspension can be manipulated sufficiently to free the driveshaft and hub splines from each other, the bottom balljoint is disconnected, by removing the 17mm nut and bolt and using a suitable splitter.

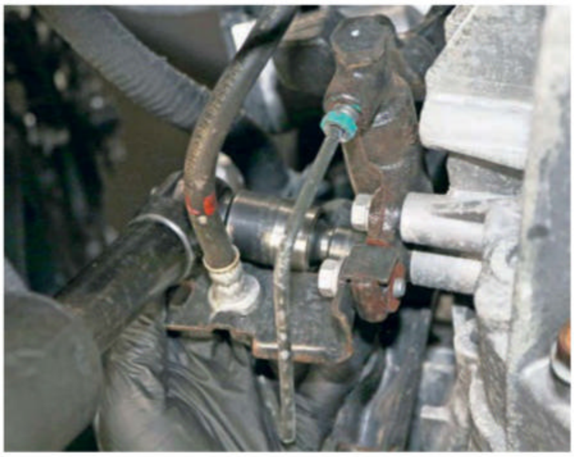
23 ▶ Very often, the driveshaft and hub splines can seize together, due to corrosion. Therefore, you may have to strike the driveshaft. Here, A1 Clutches uses a punch that fits into the shaft's centre locating hole, which avoids the risk of another method damaging the threads.

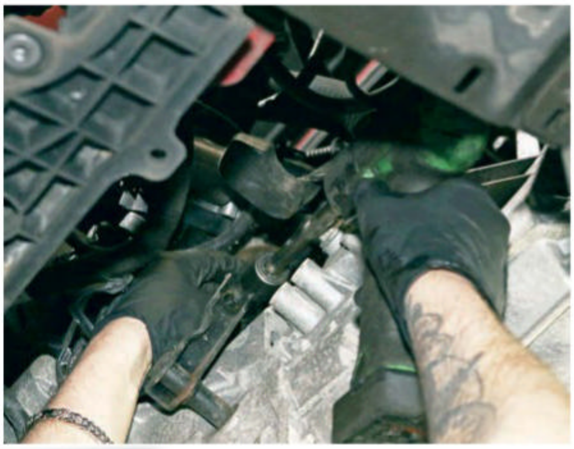




24 ◀ The driveshaft can be pulled free from the gearbox. The lower engine mount is secured with a 17mm nut and bolt and its bracket, with three 14mm bolts.

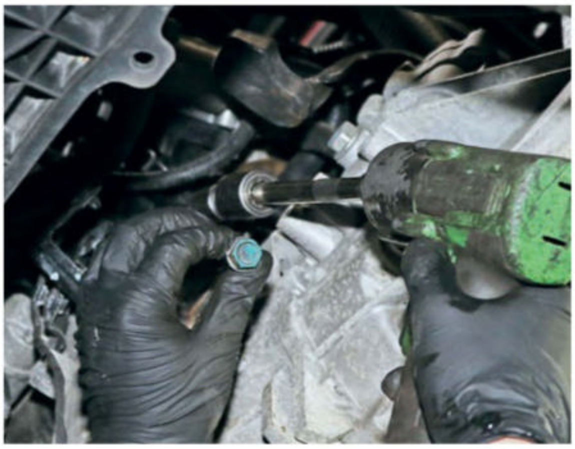
25 ▶ This Kia has an external clutch slave cylinder. While its hydraulics do not have to be disconnected, its bracket (two 12mm bolts) needs separating.

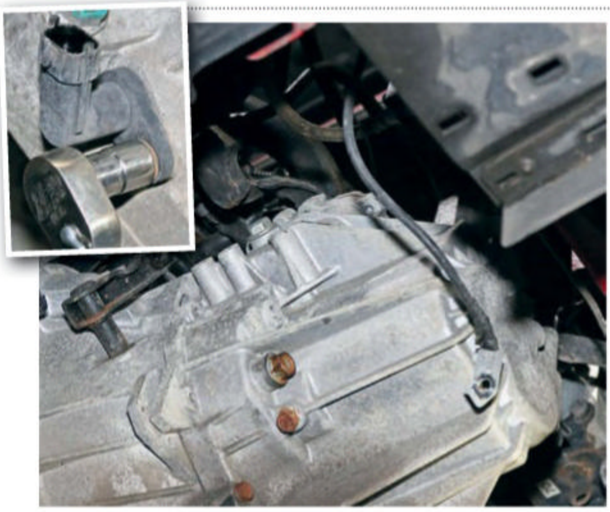




26 ◀ Another wiring loom bracket (two 10mm bolts) can be dismounted. The starter motor bolts can then be removed...

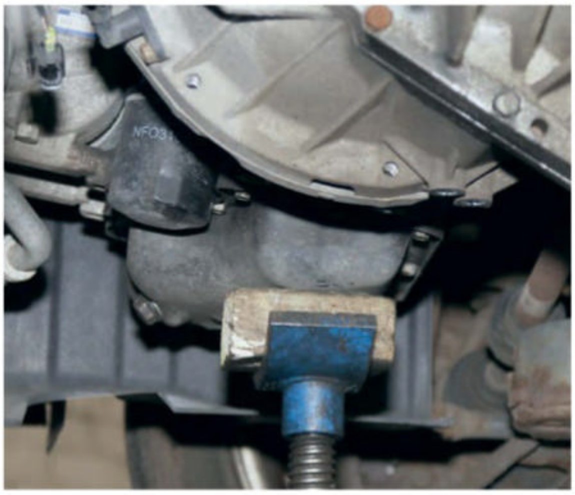
27 ▶ ...and the motor moved to one side. You can disconnect the electrical connectors and remove the motor completely, should you decide.

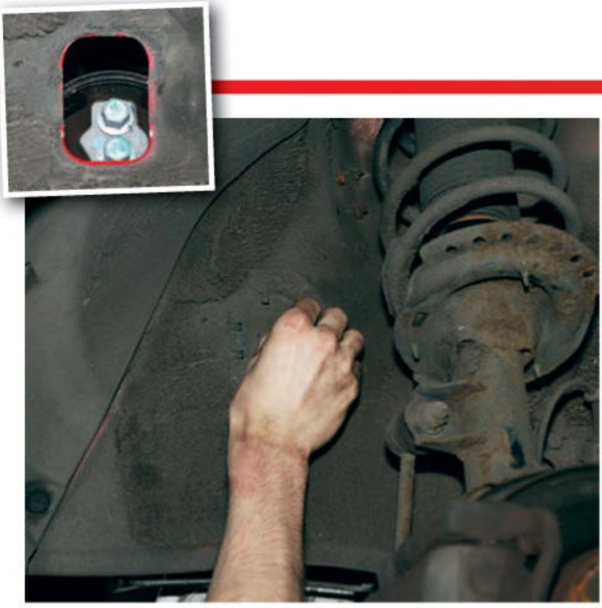




28 ◀ The final electrical connections that remain are the crankshaft sensor (secured by a 10mm bolt) and the transmission earth cable (12mm bolt).

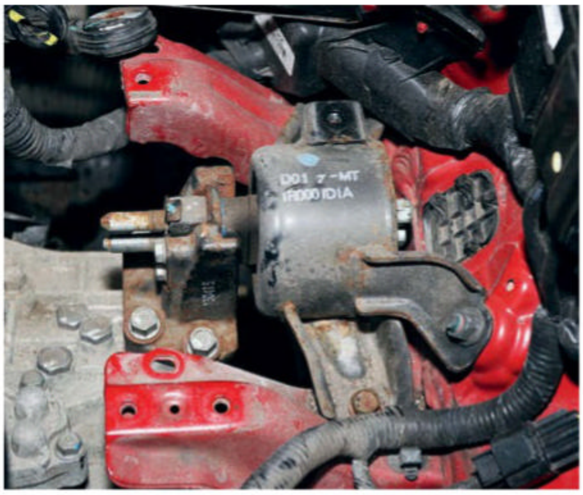
29 ▶ Should the engine need support, use a suitable method to spread the load – a simple block of wood will suffice. This method avoids distorting the sump, because oil pans are made either from thin steel, which can distort, or aluminium, which might crack.

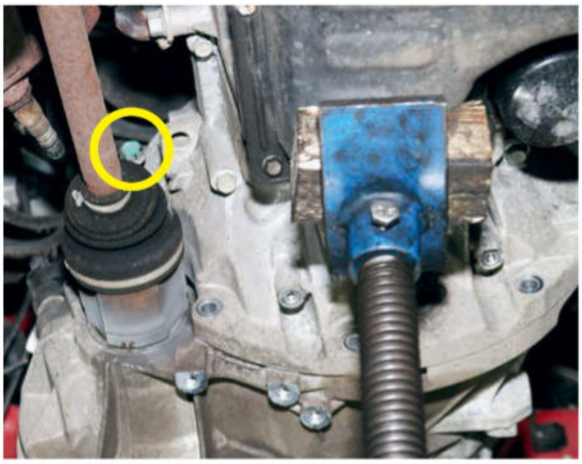




30 The two 14mm top engine mounting bolts are accessed via a dedicated plastic plate in the wheelarch lining, on this Kia.

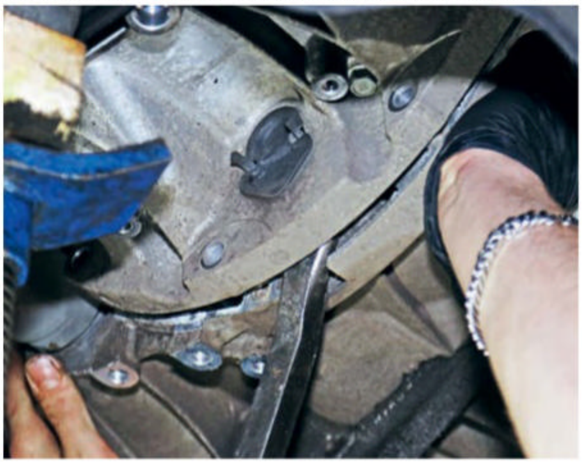
31 A further three 14mm bolts hold the top engine mount bracket to the gearbox. The mount can be lifted out of the engine bay. (NB: The inner wing plastic plate, to the left, is pictured fitted).





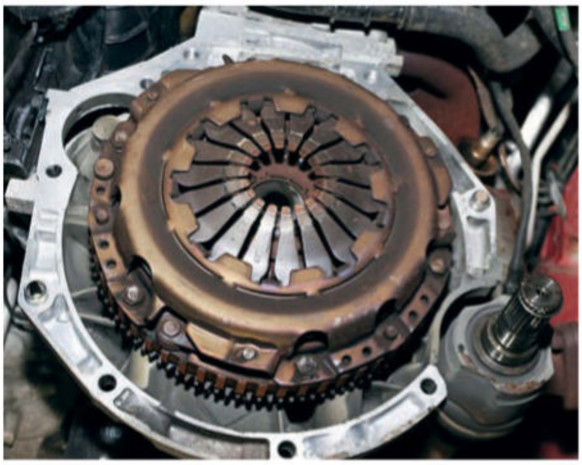
32 The final 14mm bolt (circled) that holds the engine and gearbox together is now unscrewed, as both the engine and gearbox are supported.

33 This car requires the offside driveshaft to be prised gently from the transmission case, as the gearbox is withdrawn, taking care not to damage the oil seal.



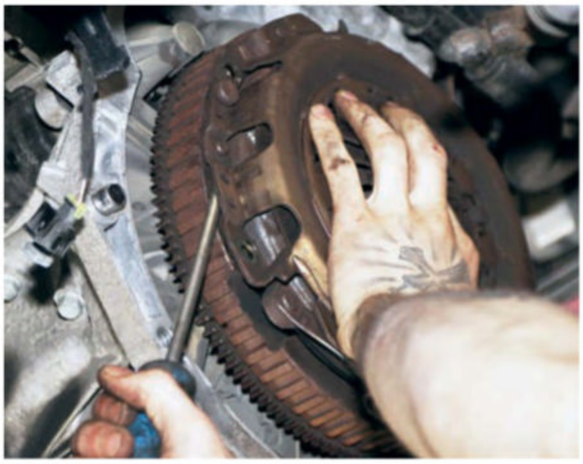
34 There is nothing wrong with levering the two castings apart gently but the gearbox must not be allowed to bear its weight.

35 Once the clutch friction plate's splines are separated from the input shaft, the gearbox can be lowered to the ground. As the casing is cast, it is brittle. Dropping the gearbox might crack it.



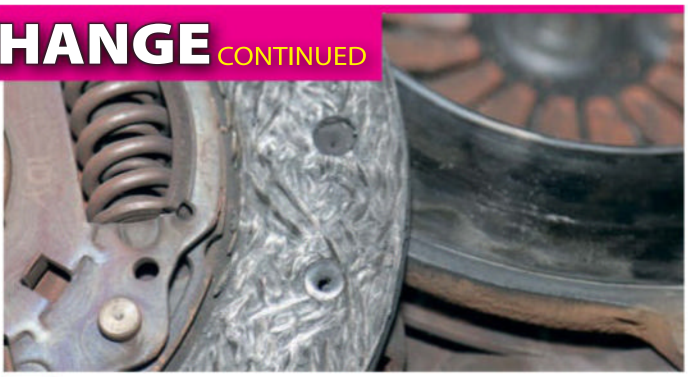
36 The clutch cover ('pressure plate') remains on the flywheel, along with the drive ('friction') disc behind it.

37 Six bolts hold the pressure plate to the flywheel on this Kia. Once they are removed, the cover can be levered from its dowels, gently.

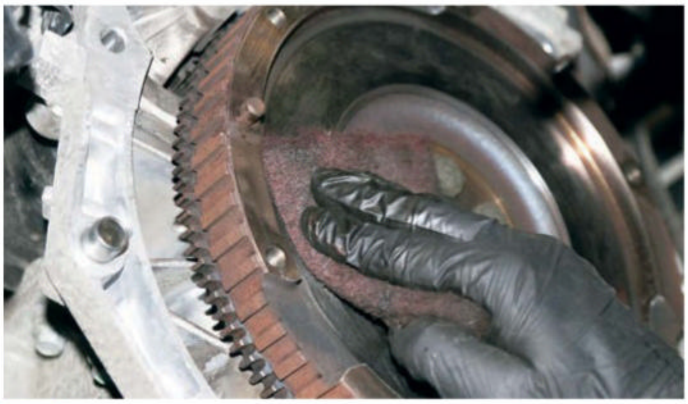


TYPICAL FWD CLUTCH CHANGE CONTINUED

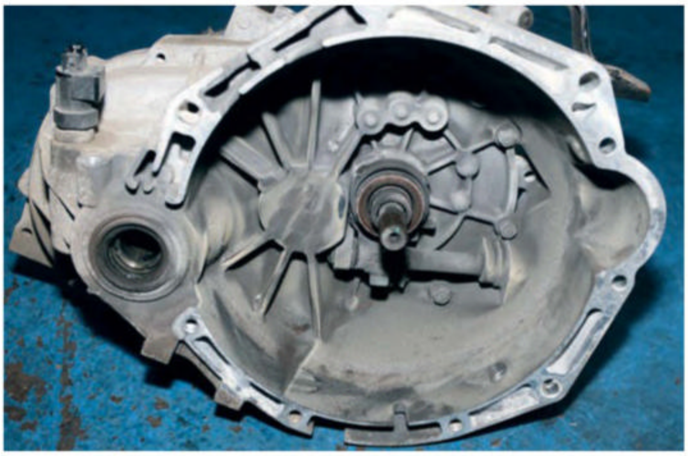
38 The drive plate will just fall out as the cover is withdrawn. They are heavy components, even on city cars, and care is needed. Should you own an older, or rare, vehicle, for which clutches are unavailable, some companies can recondition the old parts.



39 The cause of this car's slipping clutch is clear. The linings are worn out, as indicated by there being no remaining tread depth (compared against the new clutch, pictured in step 54.) The material does not have to be flush with its rivets to be worn. Note also the blue colour on the drive plate, indicating that the drive plate has overheated.



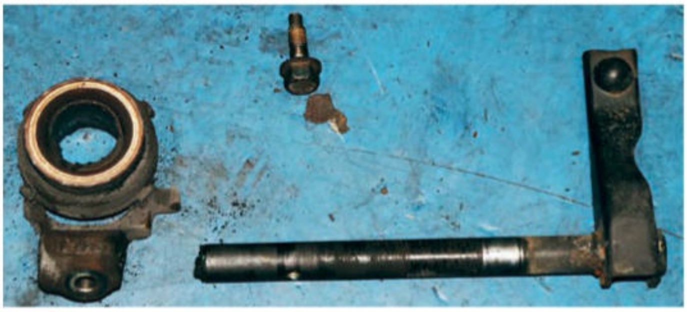
40 Verify that the flywheel face is unscored. If so, consider having it checked by an engineering works. Should it be in satisfactory condition, clean the face with a scotch pad. Never blow-out the dust – use a brake and clutch cleaner solvent. This relatively simple Kia does not possess a dual-mass flywheel – these are considered on page 9.



41 Clean out the gearbox, using degreaser, or brake/clutch cleaner. Do all that you can to avoid breathing the dust. It might not contain asbestos any more but it is still unwise to expose your lungs to it.

42 ◀ To remove the clutch release arm and shaft from the gearbox, unscrew the 14mm bolt and manipulate the shaft from the gearbox.

43 ▶ The combined clutch release bearing and fork can be lifted from the sleeve. On some cars, the sleeve can be unbolted and incorporates the front gearbox oil seal. Any traces of leaking oil must be rectified.



44 Check all release bearing components, carefully. In an increasing number of cars, the release bearing is combined with the hydraulic slave cylinder (see page 17). This basic Kia makes do with separate parts.

45 ▶ Check the fork carefully, especially at any contact point. These are not supplied with clutch kits and should be ordered separately. A1 Clutches advises that release fork wear could cause the bearing to dislodge and become misaligned on the diaphragm fingers, causing engagement issues, or clutch judder.

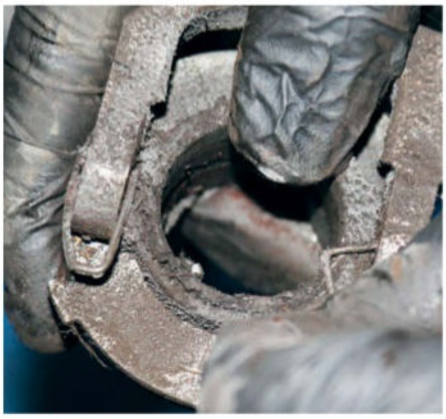
CLUTCH FAULTS: Technical terms

SLIP: The engine speed increases without any corresponding rise in road speed. The cause tends to be a worn friction drive plate.

DRAG/SPIN: The clutch will not release fully, when the clutch is depressed. This can make the lower gears, especially, hard to engage. A fault in the hydraulics tends to be the most popular cause.

SQUEAL: A high-pitched scream tends to stem from a worn clutch release bearing. Rattling tends to be caused by imminent dual-mass flywheel failure. In some instances, the clutch straps can be broken on the pressure plate.

JUDDER: A snatching sensation can be caused by contaminated friction linings, a failing DMF, a distorted drive plate, or cover. Yet, damaged engine mountings may also be responsible.



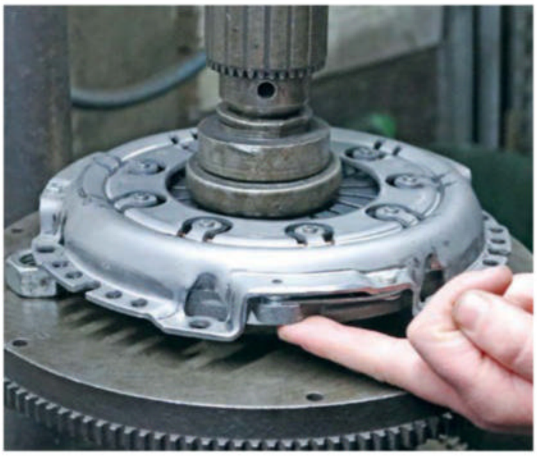
46 As the release bearing must be replaced, regardless of condition, it should be separated from the clutch fork. Some types are pressed into place; this one is held by metal clips. Care is taken not to break or bend them, because they need to be reused.

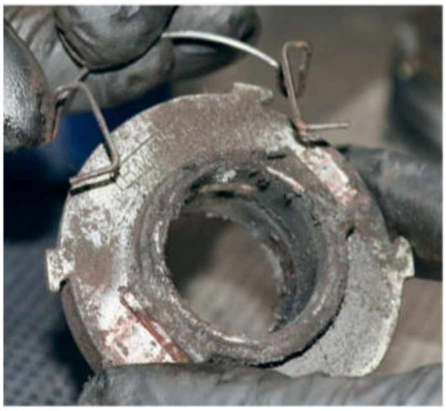
47 A1 Clutches degreases and wire-brushes the clutch arm. This removes any congealed deposits and corrosion, ensuring smooth movement and, therefore, a jerk-free pedal movement.

48 The clutch fork receives the same treatment. Clean parts are easier to inspect for damage, such as hairline cracks.

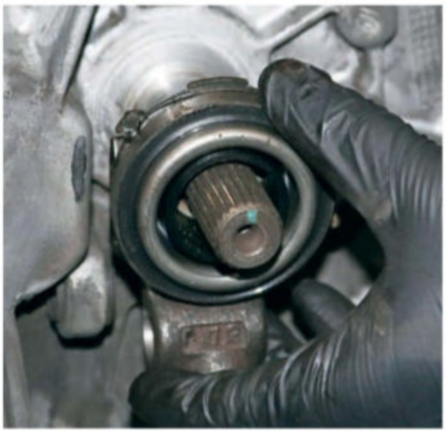
49 ◀ A1 Clutches insists that fitting cheap clutch parts is a false economy, due to the amount of effort involved with changing one. Here, an LuK clutch is being installed, produced by Schaeffler, a company that supplies both the aftermarket repair trade and car factories.

50 ▶ Despite being sturdy components, clutches can be damaged, especially if dropped. To check if the straps within the cover have not been bent, A1 Clutches tests them first, before installing the clutch to the car.

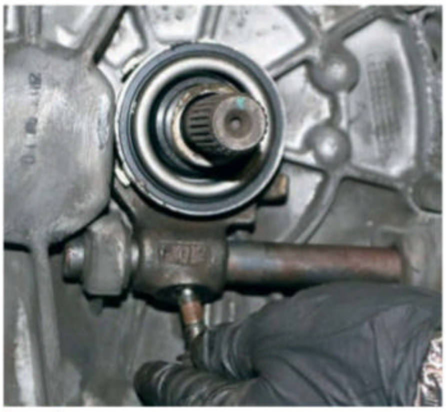




51 When fitting the release bearing, check that the retaining clip remains on the old part, if one is present. Transfer the new clip into the new bearing.

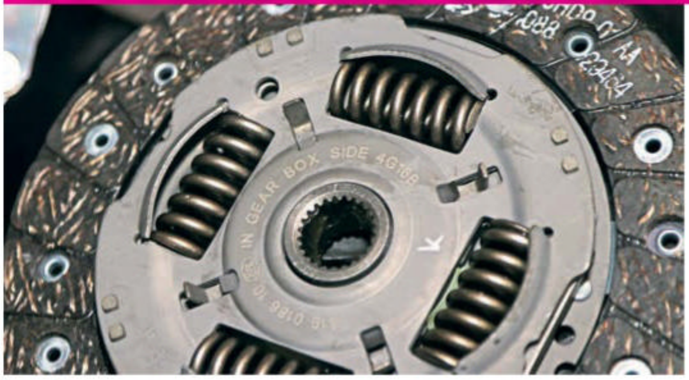


52 The fork, together with the release bearing, can be inserted into the bellhousing, over the sleeve.



53 The clutch shaft is lubricated with high melting-point grease prior to being inserted back into the casting and secured by its 14mm bolt.

TYPICAL FWD CLUTCH CHANGE CONTINUED

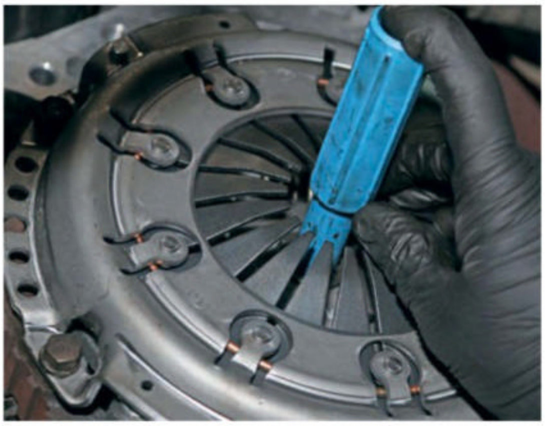


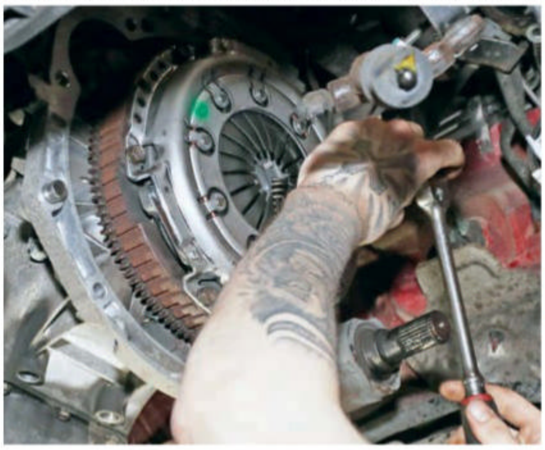
54 Handle the new clutch with clean hands/gloves. Ensure that the drive plate orientation is correct. Older cars, especially, may feature a crankshaft spigot bush. Should this need removing, you will have to take off the flywheel.

55 Install the clutch to the flywheel. The drive plate is positioned behind the cover. Locate it onto the dowels.

56 ◀ Thread in each screw by hand, first, ensuring that the drive plate does not fall out as you work.

57 ▶ Before tightening the bolts, the drive plate will need centralising, so that its splines will mesh easily with those of the gearbox. Inexpensive tools are available to do this.



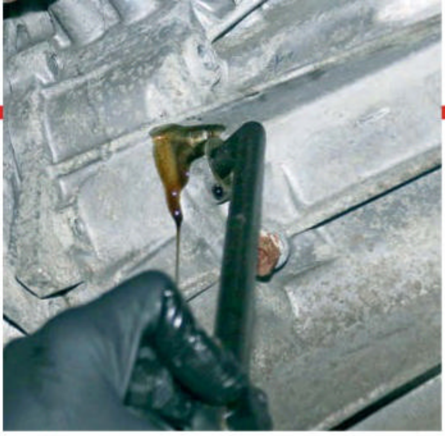


58 ◀ Unless a self-adjusting clutch cover is fitted, the clutch fixing bolts can be tightened gradually in a star shape. This ensures that even pressure is applied to the cover, so it does not distort. This instruction does not apply, if a self-adjusting cover is fitted.

59 ▶ Once the bolts are tightened to their specified torque, the gearbox can be lifted into position. The input shaft might have to be rotated slightly, to facilitate engagement with the drive plate.

60 ◀ Allowing the transmission's weight to be supported by the input shaft risks damaging not only the shaft but also the clutch drive plate. Install at least one bolt to hold the gearbox in place.

61 ▶ The remaining bellhousing bolts can be refitted, including those that secure the starter motor.



62 Research which gear oil is suitable for the vehicle and fill it to the prescribed level. On this car, the level is correct, when fluid dribbles from the filler hole. Some cars have no such provision. Therefore, drain the oil but measure how much lubricant has been expelled, before replenishing the gearbox with the recommended grade via another aperture, such as a breather.

63 The long process of refitting all of the removed parts can then begin. To use the well-worn phrase, refitting is the reverse of removal.

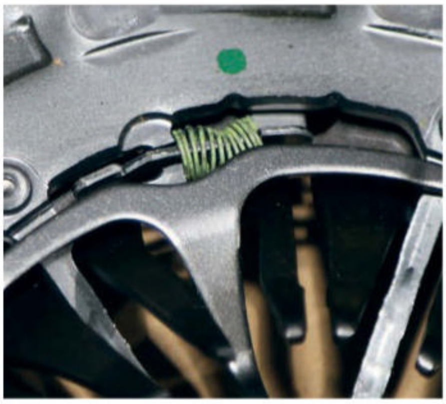
64 Once work has finished, the pedal action is checked, the engine started and the clutch is checked for drag. The car then embarks on a test drive, where clutch performance is assessed, including for noise.

SELF-ADJUSTING CLUTCHES

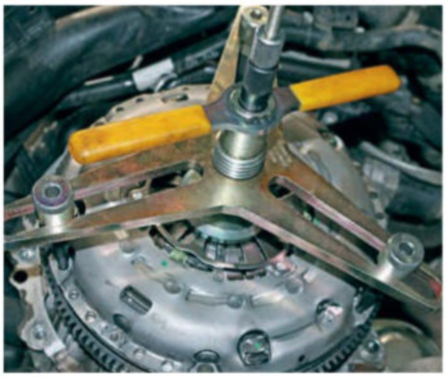
As the drive plate's friction material wears, the plate moves closer towards the engine, causing the clutch cover's fingers to move inwards. The consequence of this is a heavier pedal. Even though the clutch might not have started slipping, a complaint of a weighty pedal was a good indication of a worn-out clutch.

The self-adjusting clutch cover, however, ensures an even pedal pressure throughout the clutch's life. The integral adjusting mechanism is sealed within the cover. Should incorrect fitting activate it, it may not be able to be reset. Therefore, a warranty claim is likely to be rejected.

The following guide looks at how the SAC is installed, using a 2013 Volkswagen Scirocco 2.0-litre diesel as an example:



1 This LuK-supplied SAC possesses springs that can be used to identify the adjusting mechanism's position. Should they be extended, the mechanism has adjusted itself.



2 A special tool should be fitted to the flywheel, as pictured. It compresses the clutch's diaphragm fingers, ensuring that the clutch cover bears against the flywheel before the bolts are tightened.

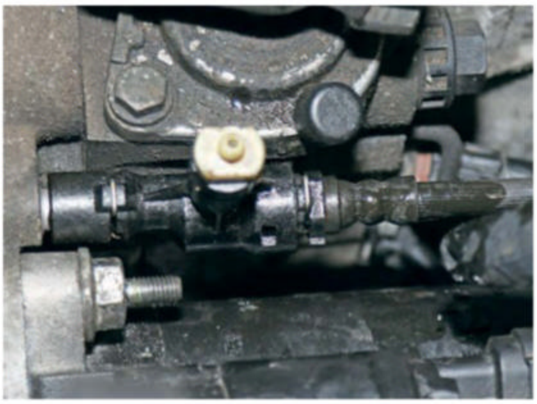
3 The bolts can then be inserted and torqued to the specified figure. If they were tightened in the conventional manner without the tool, there is an increased risk of the self-adjusting mechanism activating.

CONCENTRIC SLAVE CYLINDERS

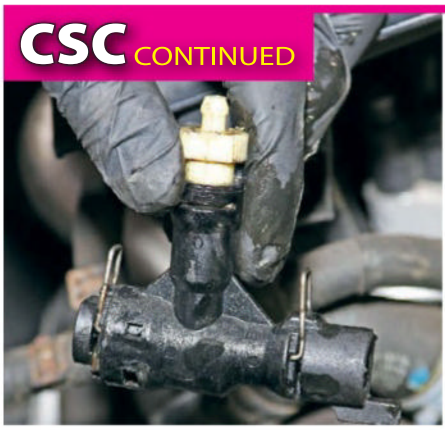
Concentric Slave Cylinders (CSC) combine the release bearing and clutch slave cylinder. This may sound ideal, and it is for the car manufacturer, but the CSC is bolted inside the gearbox. Therefore, should a leak occur (which is far from unknown), the gearbox would have to be removed to access it. Due to the labour involved, A1 Clutches advises that it is false economy not to renew the clutch, while the car is dismantled.

1 ◀ This Volkswagen Golf's owner complained that the clutch was not releasing fully. Inspection from beneath the car revealed brake fluid leaking from the starter motor. A similar symptom is brake fluid emerging between the transmission and engine. Yet, do not confuse brake fluid with gear oil.

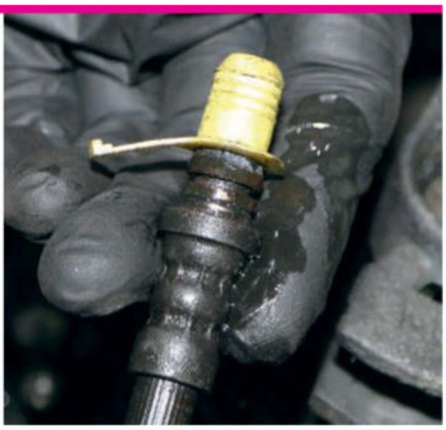
2 ▶ The CSC hydraulic line should be disconnected. On this car, it is a press fitting that is released, by raising the two securing clips.



CSC CONTINUED



3 The CSC adaptor can then be lifted free. Note the white bleed screw.



4 The hydraulic line should be plugged, to prevent leaks and dirt ingress.

A1 CLUTCHES

THANKS TO

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Tipton, West Midlands DY4 9AU.
www.a1-clutches.co.uk
0121 522 2094
Amrik Singh Callum Mason Courtney Foxall

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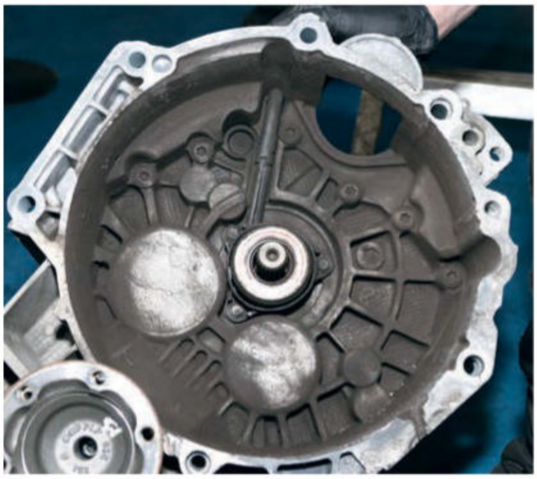
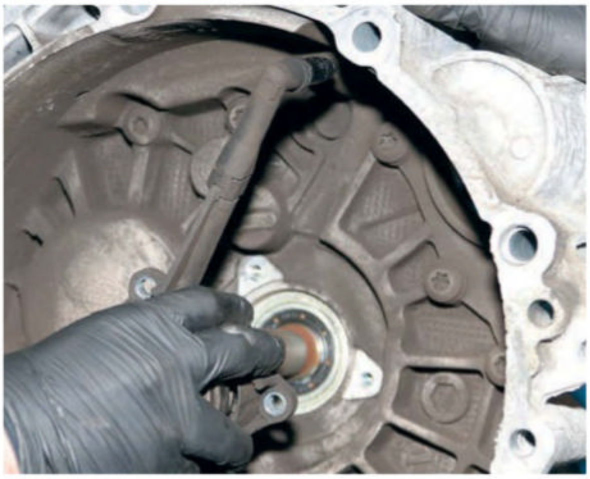
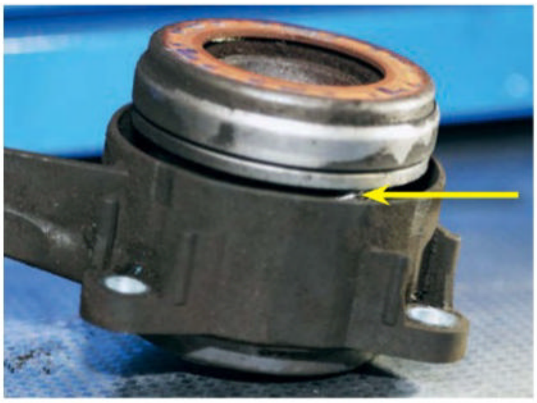


5 ◀ With the gearbox removed, the CSC is visible within the bellhousing, secured by three bolts.

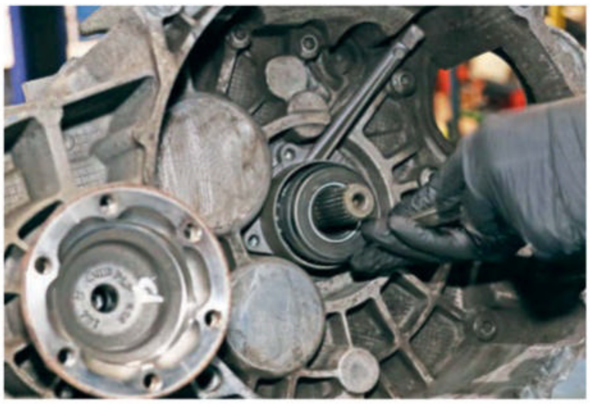
6 ▶ The whole CSC can be taken out, once the bolts are unfastened. As it is bolted into place, the unit does not possess a release bearing sleeve, because it is incorporated within the CSC.

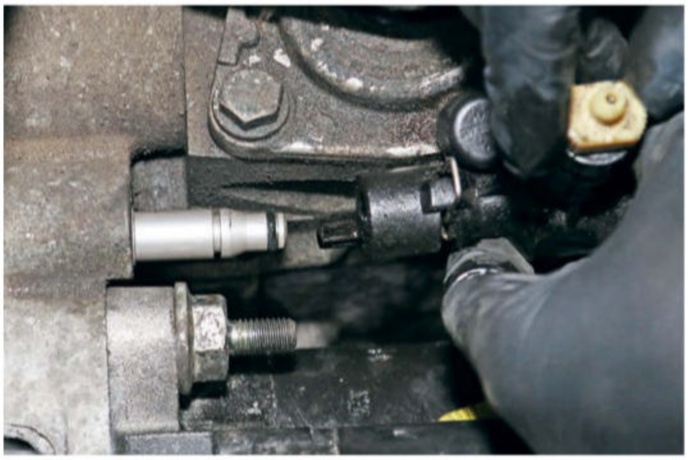




7 ◀ The hydraulic seals on this unit have failed, possibly because they are exposed to dust and moisture. CSCs cannot be dismantled; they should be replaced as a complete part.

8 ▶ The new CSC is simply bolted into place, after the bellhousing is cleaned out.





9 With the gearbox refitted to the engine, the hydraulic lines are reunited.

10 The hydraulics will then need to be bled through to remove any air bubbles that will prevent the clutch from releasing, when the pedal is depressed.

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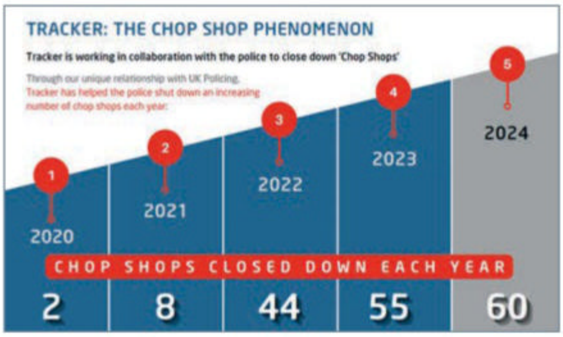
CM Insider

Martyn Knowles brings you news and product reviews from the automotive industry

Chop shops closed down



Stolen vehicle recovery expert Tracker Network UK and UK police forces uncovered a record 60 illegal 'chop shops' in 2024. This compares to just two chop shops found in 2020 and underlines the rapid growth of organised crime gangs in using these chop shops to dismantle stolen cars, strip them of parts and sell them on for profit. It's a lucrative business for the unscrupulous. In 2024, 144 arrests were also made – an increase of 80% year-on-year.

The discovery of these illegal chop shops was a direct result of police locating stolen vehicles fitted with Tracker devices that benefit from a unique combination of VHF with GPS/GSM technology. Crucially, these devices are immune to jamming, a method often employed by thieves to mask a vehicle's whereabouts.

Finding the chop shops was also a triumph for other car theft victims. In addition to the Tracker-fitted stolen vehicles found last year, another 179 other vehicles hidden in the same locations were also recovered and returned to their rightful owners.

Tracker is the only stolen vehicle recovery provider that is supported by all 43 police forces in the UK. Over 2000 police cars and all police helicopters are equipped with its technology. Clive Wain, Head of Police Liaison at Tracker says, "According to DVLA figures obtained via a Freedom of Information request, 2024 saw the third-highest number of cars stolen in the past decade, confirming that the car crime epidemic is not waning. Whilst manufacturers are investing heavily in vehicle security to combat tech-savvy thieves, the culprits are quick to adapt. Indeed, we are seeing criminals revert to 'old-school' methods to steal cars, such as breaking into houses or physically threatening and assaulting owners to take keys. It's clear owners need to do all they can to keep their vehicles safe and whilst a Tracker device won't stop a car from being stolen, it will significantly increase the chances of it being recovered before it's been broken down for parts."

GSF Car Parts secures exclusive deal to supply Amaron batteries to the UK aftermarket

GSF Car Parts has agreed an exclusive deal with renowned Indian battery manufacturer Amaron to stock a range of its products to the UK aftermarket. The brand is part of the Amara Raja group which manufactures automotive parts such as batteries and electronics. The brand sells more than 50 million batteries per year in 60 countries, with the UK joining that list following this commercial partnership. Worldwide, Amaron service more than 100 national-level distributors, including two of the top-five battery retailers in the world.

Stock will initially be available off the shelf at GSF branches in Birmingham, Bradford, Leeds and London, with stock readily available for overnight delivery across other areas of the country from GSF's National Distribution Centre.

Five battery stock keeping units (SKUs) will cover more than 8000 applications, including Mercedes CLS350 3.0L EQ Boost Coupe (2017 onwards), Vauxhall Vivaro 1.6 CDTi (2014 onwards) and Volvo XC90 MkII 2.0 B5 Mild-Hybrid (2020 onwards).

Every battery comes with a four-year unlimited mileage warranty.

For more information on Amaron's range of batteries, contact your local GSF branch.

AMARON
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Parking charges put off drivers from visiting high street

- Two thirds of drivers (62%) put off visiting their local high street due to parking charges
- Two in five say the cost of parking has risen in the past year
- Half (48%) say they would shop locally more often if parking was cheaper
- The cost of high street parking is driving people to shop online and at retail outlets with free parking

Region	**Average cost of high street parking per hour**
London	£2.50
Scotland	£2.00
North East	£1.50
Yorkshire & Humberside	£1.50
South East	£1.40
North West	£1.30
West Midlands	£1.30
South West	£1.20
East of England	£1.10
East Midlands	£1.00
Wales	£1.00
Northern Ireland	£0.90

The cost of parking puts many off visiting the shops and businesses on their local high street reveals new research from Direct Line business insurance. Despite concerns over the 'death of the high street', parking charges continue to rise, with 42% of drivers saying the cost of parking in high streets, villages and town centres around the UK has risen significantly in the past year.

The cost of high street parking is directly impacting where people choose to shop. Over half of drivers (56%) say it makes them more likely to visit a supermarket with free parking, a further 52% say that it makes them more likely to go to out-of-town shopping centres with free parking and 44% say it drives them to shop more online.

The price of parking near local shops varies from £2.50 an hour on average in London, to £0.90 an hour in Northern Ireland. The majority of drivers, 82% (35 million UK drivers) believe councils should help to save the high street by offering free parking.

News in Brief

febi launches new range of turbochargers

febi have introduced a range of OE turbochargers, available both new and remanufactured from suppliers BorgWarner and Garrett. The range covers popular car and LCV models from Volkswagen Group, Stellantis, Mercedes-Benz, BMW and many more. The range also includes periphery products like mounting kits, oil feed pipes, charger intake hoses and complete turbocharger repair kits. febi's new Turbocharger range can be found on the online parts catalogue of the bilstein group: www.partsfinder.bilsteingroup.com

WAI range expansion

WAI Europe has added eight new alternators and two new starter motors to its rotating electrics portfolio. New alternators range include part number 21007N to fit Porsche Macan, Cayenne, Panamera 3.0, 3.6 2015-2019, and part number 21781N covering popular Dacia/Renault Logan 1.6 2014-2020 applications. Other new part numbers added into the alternators range are 21903N for Opel/Vauxhall Astra, Corsa 1.0 2015-2022; reference 21913N suitable for Nissan Micra 1.5dCi 2016-; part number 21917N to fit Alfa Romeo Stelvio, Giulia 2.0 2016-; reference 21954N suitable for SEAT Leon, Skoda Fabia 1.0 2019-2022 and part number 24002N to cover Ford Mondeo ST220 2002-2007. WAI's new-to-range starter motor references include 31035N to fit Opel/Vauxhall Astra 1.4 2015-2022 and part number 31100N covering Citroën Berlingo, C3 Aircross, C5 X, Peugeot 308, 208, Partner 1.2 2016- applications.

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Refill packs available – see https://www.connect-consumables.co.uk/Index

Connect Workshop Consumables part numbers:
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30261 (150mm x 3.5mm)
30264 (300mm x 4.6mm)

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News in Brief

ECSTA SPORT S
ECSTA SPORT
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Kumho debuts ECSTA Sport ultra high-performance tyre range

Kumho Tire has announced the introduction of two new ultra-high performance products to its European ECSTA lineup: ECSTA SPORT and ECSTA SPORT S. Their increased durability enables agile and precise handling, while the optimised tread's rib design enhances stability at high speeds. Strengthening Kumho's status as a high-end brand, the new models are the culmination of development work at the Kumho Europe Technical Centre (KETC) from 2021 to 2024, resulting in improved mileage and energy efficiency. In particular, the ECSTA Sport S was recognised for its proven performance in a test conducted by TÜV SÜD, a globally renowned authority in testing and certification. The entire range has been designed to be EV-compatible, leveraging Kumho's proprietary electric vehicle technology to meet abrasion resistance and noise reduction. Selected sizes are equipped with Kumho's K-Silent system which uses polyurethane foam attached to the inside of the tyre's tread to minimise both cavity and road surface noise. Several sizes have been additionally reinforced to give them the HL (high load) capacity required to support the heavier weight of EVs.

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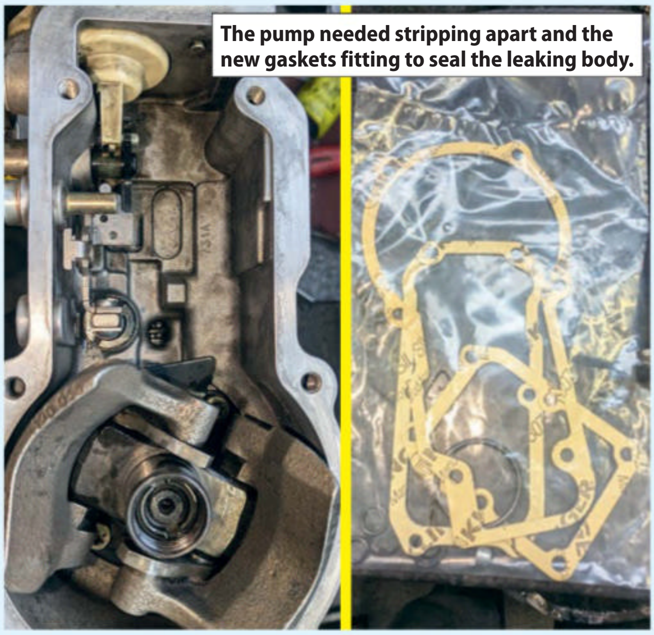
Tales from the workshop

Fixing advice from our garage proprietor **Steve Rothwell**

MERCEDES-BENZ C-CLASS

Leaking injector pump



The pump needed stripping apart and the new gaskets fitting to seal the leaking body.

This 1999 Mercedes-Benz C250D was still going strong and with 200,000 miles under its belt. It was running smoothly and was as reliable as it had always been. The problem that the owner was concerned about was that the motor was dropping a little oil when parked, and this needed to be rectified.

The source of oil leaks can of course be difficult to track down and this old diesel engine was certainly covered in a film of oil that had built up over several years.

The first step was to give the engine a good clean to allow the newly leaking oil source to be detected. This process was carried out using a brush and degreaser and then rinsing off with water. Once dried off the engine was now looking dry and clean enough to be able to locate the leak when it appeared.

Starting up the engine and gently revving to around 1500rpm, it didn't take too long to discover that the oil was escaping from the throttle housing on the injector pump.

The next step was to rectify the leak by stripping off the pump and replacing the gaskets. The pump was also given a thorough clean when off on the bench, ensuring that the mating surfaces were clean so that the new gaskets would seal efficiently. Once the pump was back in place the engine was started and checked to confirm it was now leak free.

SUBARU IMPREZA WRX-STI

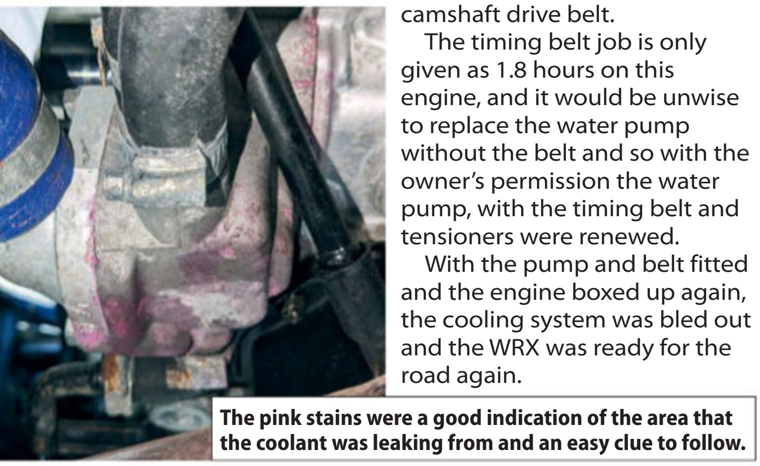
Weeping water pump

The owner of this 2007 Subaru WRX 2.0 had noticed a slight pink discolouring at the bottom of the thermostat housing and knew that the colour was coming from the loss of pink coolant which was leaving the residue. They were also aware that problems very often do not fix themselves and so getting this attended to before it developed would be a good option.

When the vehicle arrived in the workshop and I checked out the source of the pink stain, this appear to be originating from the water pump, which on this engine runs off the back of the camshaft drive belt.

The timing belt job is only given as 1.8 hours on this engine, and it would be unwise to replace the water pump without the belt and so with the owner's permission the water pump, with the timing belt and tensioners were renewed.

With the pump and belt fitted and the engine boxed up again, the cooling system was bled out and the WRX was ready for the road again.



The pink stains were a good indication of the area that the coolant was leaking from and an easy clue to follow.

VAUXHALL ASTRA

Diesel filter

The owner of this 2012 Vauxhall Astra 1.7 diesel had been a customer for many years and had always only used me for certain jobs. He was quite capable of a wide range of jobs and normally done most things himself.

He had recently decided that the oil and filter changes were better left to me as getting rid of the old oil and the old filter was now more trouble than just letting me carry out the job. Likewise, when the fuel filter needed replacing, he decided that it was better to let me dispose of the old filter than trying to stuff it in the bin with his normal rubbish.

The job is quite simple – and so the labour is minimal – but the environmental savings are worth considering. I'm sure there are a number of DIY motorists who would not be too concerned about putting the old parts in the general refuse, but these days we are all becoming a little more conscious of the environment and so disposing of these old parts should be given consideration.

The filter is nicely accessible, but it is a messy job and then requires the fuel soaked filter to be disposed of.

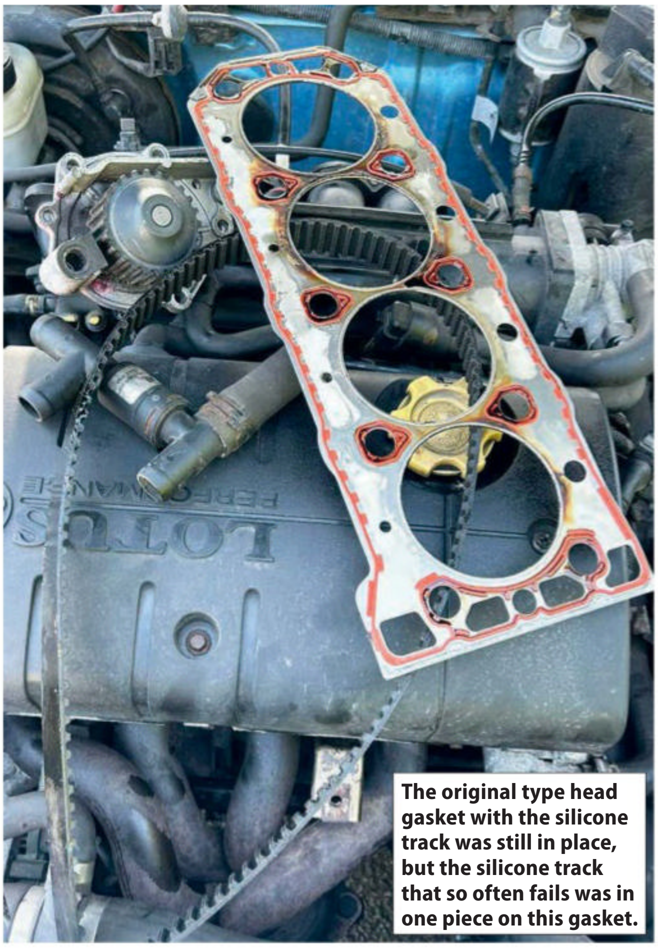
MG ZR

Head gasket failure

Going back a number of years, I can remember the regular influx of Rover owners who would come in with an overheating problem. A quick check in the coolant header tank would reveal the emulsified mix of oil and water confirming that this was another one of the many that had failed due to the silicone track on the head gasket disintegrating.

The problem was addressed with a composite head gasket along with measures to stabilise the block and liners – and was normally more common on the 1.4 version of the engine.

This 2004 MG ZR with the 1.8-litre Lotus petrol lump had come in showing signs of head gasket failure – but thankfully there was no oil in the coolant and so it appeared from the symptoms that either the silicone track was intact, or that the gasket had already been replaced with a composite alternative.


The original type head gasket with the silicone track was still in place, but the silicone track that so often fails was in one piece on this gasket.

With the head off, I discovered this did appear to be the original type gasket and other that the failure from the water jacket to the cylinder, the gasket was not in too poor a condition.

The head was sent off to be skimmed and a new timing belt and water pump were fitted before bolting the Lotus lump back together.

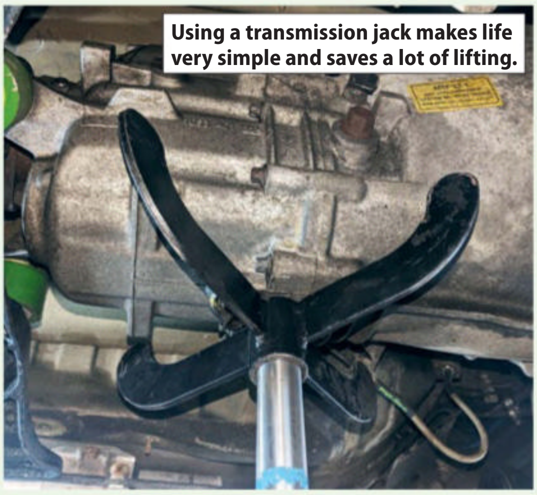
BMW 3-SERIES

Straightforward clutch job

Having been in business for quite a number of years now, I get to see some of the vehicles which have been kept by the owner returning for the replacement of parts that I originally fitted.

This 2001 BMW 328i had been into me 15 years ago when it was relatively new, for a replacement clutch. At that time the present owner had just purchased the motor and noticed that the clutch was slipping slightly.

It was now back again with similar clutch slipping problems, although the second clutch had lasted a lot longer than the first, mainly I believe as the present owner was probably a better driver than the original owner.


Using a transmission jack makes life very simple and saves a lot of lifting.

The last time I replaced the clutch on this one, I was also a lot younger and could easily lift the gearbox into place single handed. With a correctly lined up clutch, the small gearbox is quite easy to lift into place sliding it onto the course splines of the centre plate.

Now after a near-miss nearly dropping a gearbox a few years ago, I have succumbed to using a transmission jack, which not only makes replacing the gearbox a lot easier, but also helps in the removal.

GENERAL

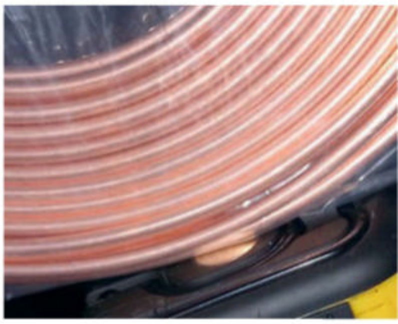
Brake pipe warning

I have been replacing rotten brake pipe for years using Kunifer Cupro Nickel brake pipe and would always recommend the same. I am not a fan of copper pipe as this is too soft, and although it bends easily, it can also bed into the unions and this means that when the union is subsequently undone, the pipe will twist with the union, rendering the pipe useless. The other problem is that it will harden with age and can fracture after repeated movement.

Kunifer pipes are 88.7% copper and 11.3% nickel and whilst the nickel is a ferrous metal, the small quantity used is not enough for Kunifer brake pipe to normally be a magnetic material.

This gave concerns for a local garage who had sourced a couple of rolls of Kunifer from a well-known online auction site for a bargain price. The old adage if it looks too good to be true then it probably is, applied as when the pipe arrived it was discovered that it was extremely magnetic, suggesting that the mix of copper and nickel was perhaps a little unbalanced, and its quality could not be guaranteed.

This is a quick warning, if you have purchased any rolls of what appeared to be good value Kunifer, I would advise checking it with a magnet before deciding to use it.


The low Nickle content of the Kunifer brake pipe should prevent it from being a magnetically attractive metal – this one was a little too attracted to the magnet.

RANGE ROVER SPORT

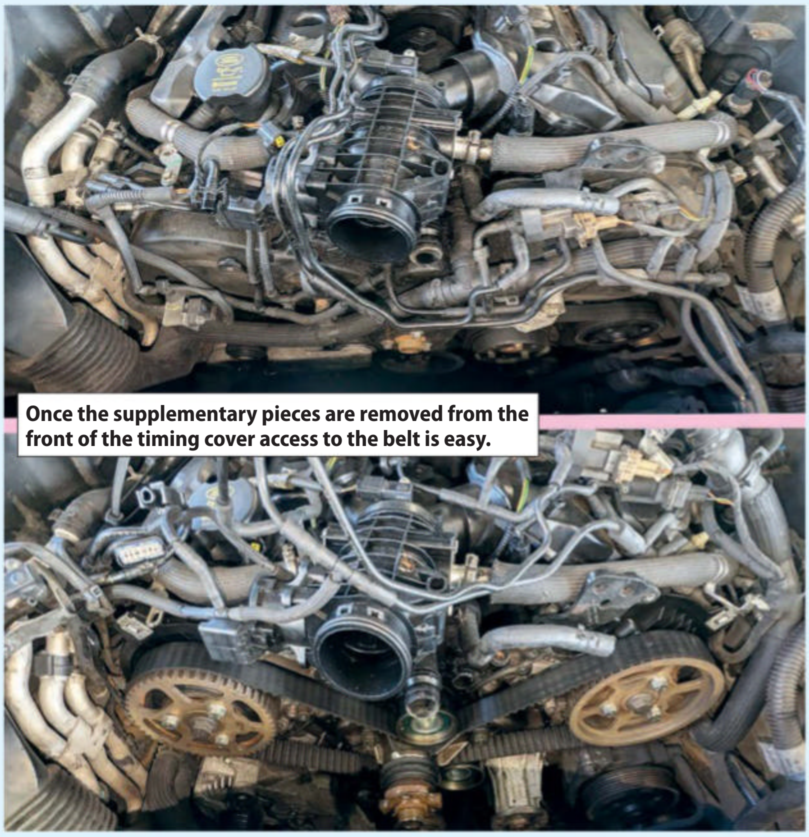
Size doesn't matter

▶ It is often presumed that the bigger the vehicle and the bigger the engine, then the more complex the operation and the more difficult the repair. This is, of course, not the case. This 2010 Range Rover Sport 3.0 TDV6 was a good example. The motor was due for the timing belt change and the job on this engine is given a book time of 3.7 hours. This is an easily achievable time and with the inline engine it is quite an enjoyable job.

If I were to contrast this with the timing belt job on the small 1.0 Ford EcoBoost engine which has a book time of 7.7 hours and is a good day's work, then it is easy to see that size does not matter – it is the way that the engine is designed that makes the difference.

Once the exterior pipework is cleared away, the timing belt can be easily accessed making the job pleasant to carry out.

The downside on this engine is that it does also have a high-pressure fuel pump drive belt at the rear of the engine, but the customer informed me that had been renewed along with the fuel pump less than 18 months ago and was happy to leave that in place.



Once the supplementary pieces are removed from the front of the timing cover access to the belt is easy.

CLASSIC FORD

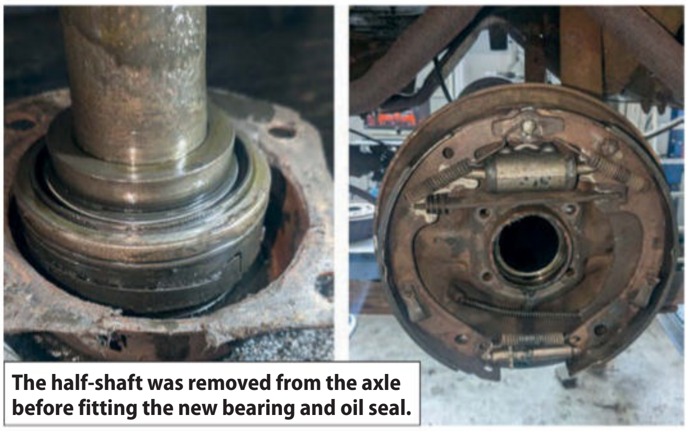
Half-shaft bearing

▶ Whilst trying to find the details on this 1946 Ford Coupe that arrived in the workshop needing a new rear hub bearing, I did discover that the old 5.7-litre engine in this vehicle had not prevented it from being ULEZ-friendly – so while someone with a much newer and effectively less polluting modern vehicle would need to pay a daily charge, this almost octogenarian Ford would be totally exempt.

Working on older motors like this does make a change from the complexities of some of the more modern vehicles that come into the workshop daily. The old axle oil did though have a sweet sickly smell that lingered for the rest of the day.

Once the new bearing, complete with the oil seal, had been fitted onto the half-shaft, the half-shaft could be fitted back into the axle and the brakes bottled up.

Once back together, the rear axle was topped up with some suitable EP90 and the old motor delivered back to its owner, who is actually quite a few years younger than his vehicle.



The half-shaft was removed from the axle before fitting the new bearing and oil seal.

MINI ONE

Leaking aircon condenser

▶ A little bit of summer sun and a sudden rise in temperature is normally enough to trigger a few phone calls from owners who have discovered that the air-conditioning in the vehicle is no longer operating, leaving them cooking in the short summer season when the aircon is most needed.

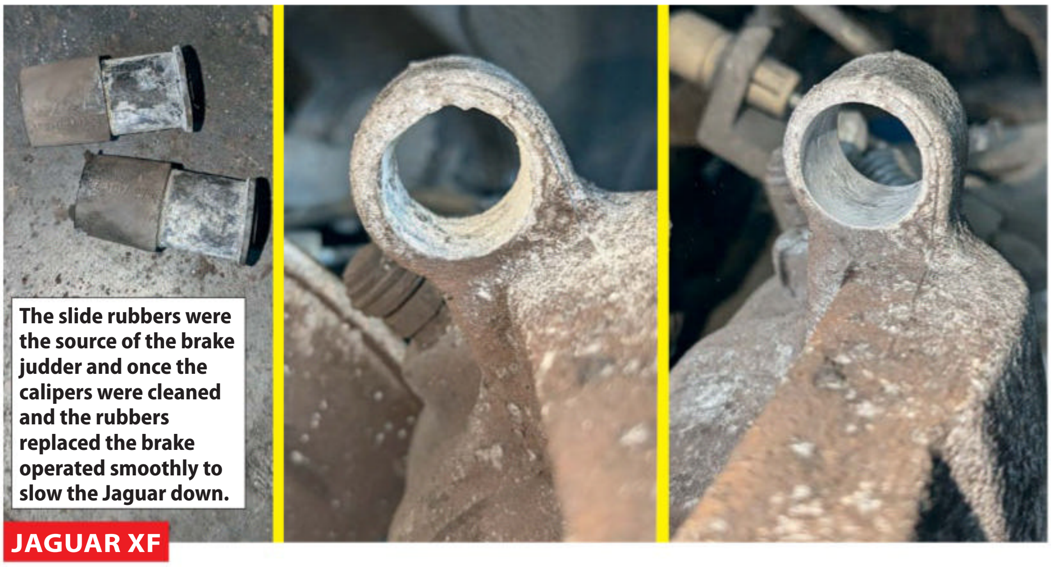
This owner of this little 2013 MINI One 1.6 diesel was one of those who called during one of our rare hot spells.

The owner was hoping that it would simply be a matter of a quick re-gas and all would be back to normal, but when the MINI came in and a pressure check was carried out on the system, it was discovered that there was a leak in the system. The next stage was then to find out where that leak was from.

Thankfully with a little UV dye and a good look around the system with a black light, the leak was exposed. This turned out to be in the condenser at the front of the MINI, and so I suspect that it was a combination of age and possibly a collision with debris that caused the failure.

Once the fault had been found, the condenser could be renewed and then the system recharged. When the MINI was returned to the owner it was with an ice-cold interior.

The condenser sits right at the front of the MINI and so is the first point of contact for any flying debris from the road.



The slide rubbers were the source of the brake judder and once the calipers were cleaned and the rubbers replaced the brake operated smoothly to slow the Jaguar down.

JAGUAR XF

Rear brake judder and unevenly worn pads

The juddering that went through the vehicle when slowing down from any speed above 50mph was quite severe and certainly ruining the driving experience of this 2012 Jaguar XF.

After a short road test, the fault was soon diagnosed as a developing problem from the rear brakes. The owner had confirmed that this had started as an almost unnoticeable vibration but had developed to its present condition over the past couple of weeks.

Stripping down the rear brakes and checking the calipers, it could be seen that the pads had worn unevenly and the cause of this appeared to be the slide fixings on the rear brake calipers.

The dried-out rubber supports that the slide is fitted into were both worn and aging and were allowing the caliper to move sufficiently when braking to give the vibration that was being felt throughout the rear of the Jaguar.

Fortunately, the slides and the rubber mounts are available and so the problem is easily rectified. As this had allowed the rear brake pads to wear these were also renewed. When the Jag went out on the next road test it was now braking smoothly.

NISSAN NAVARA

ABS biting problem

Getting into his 2015 Nissan Navara 3.0 diesel pick-up one morning, the owner was upset to see the ABS light shining brightly after the engine had been started. When he had parked it up the previous evening the ABS light had been out, and all was working well.

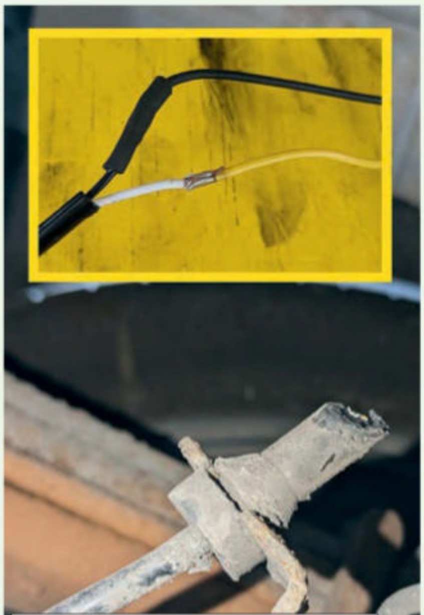
He popped into the garage during the morning and asked me to check out the reason for the light.

With the scanner plugged in the information was quickly received showing that one of the ABS wheel speed sensors had an open circuit. A casual glance around the offending sensor was enough to fully diagnose the fault. It appears that a creature of the night had decided to make a meal of the loom from the body to the sensor and had chewed its way completely through the wire.

This is something that I come across quite regularly, and even owners who live in the town can suffer from such damage. It appears to be the case that the odour from the wiring loom holds some attraction to the rodent classes who enjoy a night-time munch.

The remedy in this situation was to repair the loom and then seal it up with a good insulation tape. The wire was then encased in a section of plastic casing.

The owner is now hoping that the rodent does not return for another munch on another section of wiring overnight.



The ABS loom to the sensor had been bitten clean through but thankfully it was possible to make a repair to save the cost of a new sensor.

MERCEDES-BENZ A-CLASS

Missing injector

The title missing injector does of course not indicate that the injector was not there, but that it was failing to operate correctly allowing the engine to misfire. This 2004 Mercedes-Benz A190 had according to the owner been feeling a little fluffy of late but was otherwise running well.

Then one evening the engine management light had come on and the misfire detected. The owner had then filled with premium fuel in the hope that this would solve the problem, but it had no effect.

Bringing the A-Class along to me I checked the displayed codes to discover P0262 and P0301. The first code indicating a circuit problem on injector 1 and the second code confirming that the misfire was on cylinder 1.

The first check was to ensure that the connection to the injector was good and that the loom appeared to be OK. This all looked good and so the resistance of the injector was then checked – this should read around 14Ω but was way off the scale indicating that the injector was the problem.

With the new injector ordered up and fitted, the codes were cleared and the engine started. It now ran smoothly once again.

The injector was in place OK but the tests proved that the failed injector was the source of the engine misfire that was now present.

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0844 880 1265

Machine Mart
1400

GARAGES/WORKSHOPS

- Extra tough triple layer cover
- Heavy duty steel tubing
- Ratchet tight tensioning

BRIGHT WHITE INTERIOR

LENGTH UP TO 40'

ZIP CLOSE DOOR

CIG81220

KEEPS THE WEATHER OUT!

PRICE CUT NOW FROM £239.98 exc.VAT
£287.98 inc.VAT
WAS £298.80 inc.VAT

Model	Dims	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
CIG81212	3.6 x 3.6 x 2.5m	140613584	£239.98	£298.80	£287.98
CIG81015	4.5 x 3 x 2.4m	140613570	£276.00	£334.80	£331.20
CIG81216	4.9 x 3.7 x 2.5m	140613574	£315.00	£382.80	£378.00
CIG81020	6.1 x 3 x 2.4m	140613572	£345.00	£418.80	£414.00
CIG81220	6.1 x 3.7 x 2.5m	140613576	£385.00	£466.80	£462.00
CIG81224	7.3 x 3.7 x 2.5m	140613578	£479.00	£586.80	£574.80
CIG1432	9.7x4.3x3.65m	140613594	£1079.00	£1318.80	£1294.80
CIG1640	12x4.9x4.3m	140613596	£2398.00	£3118.80	£2877.60

TURBO AIR COMPRESSORS

- Superb range ideal for DIY, hobby & semi-professional use

TIGER 8/260

tiger
airmaster

PRICE CUT NOW FROM £104.99 exc.VAT
£125.99 inc.VAT
WAS £129.59 inc.VAT

Model	Motor	Tank	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
8/260	2HP	24ltr	000119490	£104.99	£129.59	£125.99
11/550	2.5HP	50ltr	000119505	£159.98	£203.98	£191.98
16/550	3HP	50L	000119510	£229.98	£286.80	£275.98
16/1050	3HP	100ltr	000119515	£289.98	£358.80	£347.98

ALUMINIUM RACING JACKS

Clarke RACING

FROM £104.99 exc.VAT
£125.99 inc.VAT

- Quick lift
- Non-marking nylon wheels

CTJ1250AC

Model	Lifting Cap.	Order Code	exc.VAT	WAS exc.VAT	inc.VAT
CTJ1500QL	1.5T	020112633	£104.99	-	£125.99
CTJ1250AC	1.25T	020111818	£125.99	£155.98	£151.19
CTJ2500QLGB	2.5T	020112803	£159.98	£203.98	£191.98
CTJ1800AB	1.8T	020113202	£189.98	£233.99	£227.98

JUMP STARTS

JS1224

JS4000

JUMP START 4000

EXTRA LONG 1M LEADS

BEST SELLER

FROM £96.99 exc.VAT
£116.39 inc.VAT

HUGE RANGE IN STORE AND ONLINE

Model	Starts Engines up to	Peak Amps	Order Code	exc.VAT	inc.VAT
JS1100C	3L	1100	010310015	£96.99	£116.39
JS1224LiN	6L	1200	010318905	£144.99	£173.99
JS4000	6L	2200	010311030	£164.99	£197.99
JS1224	6L	2000	010311224	£179.98	£215.98

PRO TOOL CHESTS & CABINETS

SEE ONLINE FOR OUR HUGE RANGE OF TOOL STORAGE

PRICE CUT NOW FROM £149.98 exc.VAT
£179.98 inc.VAT
WAS £185.99 inc.VAT

3
1
2
BALL BEARING

	Model	Description	Order Code	exc.VAT	inc.VAT
1	CBB209C ‡	9 Dr Chest	070118032	£149.98	£179.98
2	CBB217C	7 Dr Cabinet	070118057	£279.00	£334.80
3	CTC1300C	13 Dr Combi	070113042	£189.98	£227.98

ELECTRIC HEATERS

FROM £42.99 exc.VAT
£51.59 inc.VAT

BEST SELLER

DEVIL 7003

DEVIL 2850

Model	Voltage	Heat Output	Order Code	exc.VAT	inc.VAT
Devil 2850	230V	1.4-2.8kW	010415801	£42.99	£51.59
Devil 7003	230V	1.5-3kW	010415450	£64.99	£77.99
Devil 6009	400V	4.5-9kW	010416009	£124.99	£149.99
Devil 7009	400V	4.5-9kW	010415454	£149.98	£179.98
Devil 6015	400V	5-10-15kW	010416015	£184.99	£221.99

GENERATORS

FROM £219.00 exc.VAT
£262.80 inc.VAT

Clarke POWER

ALSO DIESEL GENERATORS UP TO 125KVA

PG3800ADV
Honda engine models available

‡ WAS £334.80 inc.VAT
◆ WAS £634.80 inc.VAT ● WAS £1138.80 inc.VAT

Model	Volts	KVA	HP	Order Code	exc.VAT	inc.VAT
PG2500A	230	2.2	5.6	010617850	£219.00	£262.80
PG3800A	230	3	5.6	010617852	£249.00	£298.80
PG3800ADV ‡	230/110	3	5.6	010617854	£269.00	£322.80
PG6500ADVES◆	230/110	5.5	9.7	010617856	£519.00	£622.80
PG9000ADVES●	230/110	5.5	16	010617860	£895.00	£1074.00

INVERTER GENERATORS

FROM £249.00 exc.VAT
£298.80 inc.VAT

2 KVA

‡ WAS £1078.80 inc.VAT
◆ WAS £2230.80 inc.VAT

IG1900

Model	Max Output	Weight KG	Order Code	exc.VAT	inc.VAT
IG1700F	1700W	22	010617095	£249.00	£298.80
IG1100	1050W	13.4	010611103	£279.00	£334.80
IG1900	2000W	20	010617117	£329.00	£394.80
IG2300	2200W	21	010612302	£389.00	£466.80
IG4000‡	3800W	57	010617130	£895.00	£1074.00
IG8000 ◆	7500W	129	010617135	£1699.00	£2038.80

DRILL PRESSES

CDP102B

- Range of precision bench & floor presses for enthusiast, engineering & industrial applications

PRICE CUT NOW FROM £84.99 exc.VAT
£101.99 inc.VAT
WAS £113.99 inc.VAT

B = Bench mounted F = Floor standing

Model	Motor (W) Speeds	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
CDP5EB	350 / 5	060712030	£84.99	£113.99	£101.99
CDP5RB	350 / 5	060710035	£89.98	£113.99	£107.98
CDP102B	350 / 5	060715512	£109.98	-	£131.98
CDP152B	450 / 12	060715522	£179.00	-	£214.80
CDP452B	550 / 16	060715575	£289.00	£358.80	£346.80
CDP502F	1100 / 12	060715592	£675.00	£826.80	£810.00

MICRO JUMPSTARTS

FROM £49.98 exc.VAT
£59.98 inc.VAT

JUMP START MICRO 1000

- Compact enough to fit in a vehicle glove box

JSM1000

‡ WHAT CAR BEST JUMP STARTER 2024

* AUTO EXPRESS CHOICE JUMP STARTER 2024

Model	Start Boost	Peak Boost	Order Code	exc.VAT	inc.VAT
JSM600	300A	600A	010319020	£49.98	£59.98
JSM1000*	500A	1000A	010319025	£59.98	£71.98
JSM1200‡	600A	1200A	010319030	£69.98	£83.98

MODULAR STORAGE SYSTEMS

10 PACKAGES IN THE RANGE

PRICE CUT NOW FROM ONLY £1059.00 exc.VAT
£1270.80 inc.VAT
WAS £1318.80 inc.VAT

SAVE UP TO £479 compared to individual prices

COMBGSM02 070112897

- CREATE THE PERFECT FITTED GARAGE/WORKSHOP
- HEAVY DUTY, PROFESSIONAL PACKAGES
- ALL UNITS ALSO AVAILABLE SINGLY FOR CUSTOM BUILD

TOOL KIT SETS

300 HAND TOOLS INCLUDED

CHT859
040210641

FROM £84.99 exc.VAT
£101.99 inc.VAT

SEE ONLINE FOR FULL DETAILS OF THESE TOOL KIT SETS

Model	Pieces	Order Code	exc.VAT	inc.VAT
CHT641	199	040210641	£84.99	£101.99
PRO394	90	040218394	£109.98	£131.98
CHT862	235	040212862	£114.99	£137.99
CHT859	300	040213859	£197.00	£236.40
PRO396	222	040218396	£629.00	£754.80

BOLTLESS SHELVING/ BENCHES

FROM £39.98 exc.VAT
£47.98 inc.VAT

- Simple fast assembly in minutes using only a hammer

CHOICE OF 5 COLOURS
🟥 🟦 ▨ ▨ ▨
RED, BLUE, SILVER, GREY & GALVANISED STEEL

Model	Dims WxDxH(mm)	Order Code	exc.VAT	inc.VAT
150kg	800x300x1500	070710802	£39.98	£47.98
350kg	900x400x1800	070710808	£57.99	£69.59

BATTERY CHARGERS /ENGINE STARTERS

BC125

FROM £89.98 exc.VAT
£107.98 inc.VAT

- Ammeter
- Multi-position charge regulator
- Overload protection on charging cycle

Model	Max Amps Charge/ Boost	Order Code	exc.VAT	inc.VAT
BC125	20/120	010310125	£89.98	£107.98
BC190	38/180	010310190	£104.99	£125.99
WBC180 ‡	35/180	010311500	£149.98	£179.98
WBC400 ◆	60/350	010311515	£199.98	£239.98
BC520P	50/510	010311082	£259.00	£310.80

‡ WAS £191.98 inc.VAT ◆ WAS £262.80 inc.VAT

2 & 3 TONNE TROLLEY JACKS

FROM £49.98 exc.VAT
£59.98 inc.VAT

JACKS ALSO IN STOCK UP TO 5 TONNE

CTJ2250LP

Model	Type	Tonne	Order Code	exc.VAT	inc.VAT
CTJ2250LP*	Low Profile	2.25	020113070	£49.98	£59.98
CTJ3000GB	Pro Garage	3	020113032	£109.98	£131.98
CTJ3000C	Pro Garage	3	020113037	£149.98	£179.98
CTJ2QLP ●	Low Quick Lift	2	020111820	£149.98	£179.98

*CTJ2250LP has a 2.25 tonne capacity, has a low entry of only 80mm and includes 2 sockets

● WAS £183.59 inc.VAT

TURBO FAN GAS HEATERS

DUAL VOLTAGE 230& 110 VOLT

IN STOCK FROM £203.98 inc.VAT

Offering low cost, efficient heating

FROM £89.98 exc.VAT
£107.98 inc.VAT

Clarke
LITTLE DEVIL II
SPACE HEATER

LITTLE DEVIL II

PROPANE GAS FIRED

Model	Max. Output	Order Code	exc.VAT	inc.VAT
Little Devil II	10.3kW	010416020	£89.98	£107.98
Devil 700	15kW	010410182	£114.99	£137.99
Devil 900	24.9kW	010410186	£169.98	£203.98
DEVIL 900DV	24.9kW	010411175	£169.98	£203.98
DEVIL1600DV	36.6kW	010411191	£199.00	£238.80
Devil 1600	36.6kW	010410190	£199.98	£239.98
Devil 2100	49.8kW	010410194	£259.98	£311.98

18V ½" IMPACT WRENCH

- 3 forward and reverse gears

450NM

BRUSHLESS

powered by Li-Ion

2x2AH

FROM £99.98 exc.VAT
£119.98 inc.VAT

‡ Auto Express Best Buy 2024

Model	Desc	Batteries	Order Code	exc.VAT	inc.VAT
CCIW160	Cordless	2X 2AH LI-ION	060210658	£99.98	£119.98
CIR 184LIP‡	Cordless	2X 4AH LI-ION	060210619	£144.99	£173.99

HOT WASHER

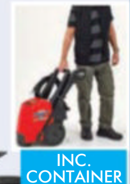
HARRY 2
050412181

Ideal for effective cleaning with a hot jet of up to 80°C

£579.00 exc.VAT
£694.80 inc.VAT

145 Bar
2100 PSI

Clarke
HARRY 2
HOT WASH



INC. CONTAINER FOR DETERGENT

SANDER & POLISHER

£69.98 exc.VAT
£83.98 inc.VAT

CP185
060310185

180mm PAD DIA.

BEST SELLER

- 6 stage variable speed control

CAR RAMPS

UK MADE

- Lift cars safely and quickly
- Tough angled steel construction

CR2

FROM £39.98 exc.VAT
£47.98 inc.VAT
PER PAIR

Model	Capacity	Order Code	exc.VAT	inc.VAT
CR2	2000kg	051710149	£39.98	£47.98
CRW25	2500kg	051710153	£47.99	£57.59

EASY TO USE WEBSITE

machinemart.co.uk

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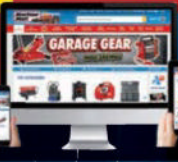

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SHOP ONLINE

DEHUMIDIFIERS

REMOVE DAMP

IDH50L

FROM £104.99 exc.VAT £125.99 inc.VAT

DH30L

‡ WAS £239.98 inc.VAT

Models	Extraction Rate	Order Code	exc.VAT	inc.VAT
DH10L	10L/day	010410687	£104.99	£125.99
DH20L	20L/day	010410683	£169.98	£203.98
DH30L‡	30L/day	010410685	£189.98	£227.98
IDH50L	50L/day	010410611	£469.00	£562.80

LOW NOISE AIR COMPRESSORS

SHHH24/150
000112440

FROM £139.98 exc.VAT £167.98 inc.VAT

LOW NOISE LEVEL

Model	HP	CFM	Order Code	exc.VAT	inc.VAT
SHHH24/150	1.5	7	000112440	£139.98	£167.98
SHHH50/150	1.5	7	000112445	£179.98	£215.98
SHHH50/350	3.5	16.9	000112450	£269.00	£322.80

HEAVY DUTY LONG REACH JACKS

PRICE CUT NOW FROM £264.99 exc.VAT £317.99 inc.VAT WAS £322.80 inc.VAT

CTJ2GLS

Model	Tonnes	Order Code	exc.VAT	inc.VAT
CTJ2GLS	2	020111026	£264.99	£317.99
CTJ3GLS	3	020113085	£349.00	£418.80
CTJ5GLS	5	020113090	£469.00	£562.80
CTJ10GLS	10	020113095	£649.00	£778.80

● WAS £322.80 inc.VAT

HYDRAULIC PRESSES

FROM £169.98 exc.VAT £203.98 inc.VAT

PROFESSIONAL QUALITY

Built for tough daily use in automotive/industrial workshops

* Available with/without 7 pce pin, bracket & pressing plate kit

# Economy model

CSA30FP

‡ WAS £454.80 inc.VAT

Model	Order Code	exc.VAT	inc.VAT
CSA4B-4 tonne bench#	020413025	£169.98	£203.98
CSA10EP 10 tonne bench*	020414025	£189.98	£227.98
CSA12F 12 tonne floor*#‡	020413020	£369.98	£443.98
CSA20FBT 20 tonne floor	020414058	£489.00	£586.80
CSA30FPB 30 tonne floor	020415201	£959.00	£1150.80
CSA50FPB 50 tonne floor	020415203	£1699.00	£2038.80

WORKSHOP AIR TOOLS

CAT131
000310131

PRICE CUT £54.99 exc.VAT £65.99 inc.VAT WAS £68.39 inc.VAT

BEST SELLER

PGF14
000510090

PRICE CUT £25.99 exc.VAT £31.19 inc.VAT WAS £32.39 inc.VAT

INTELLIGENT BATTERY CHARGER/ MAINTAINERS

FROM £39.98 exc.VAT £47.98 inc.VAT

IBC20

Model	Tank Volume	Flow Rate Req.	Order Code	exc.VAT	inc.VAT
IBC7	12/24V	7A	010317008	£39.98	£47.98
IBC15	12V	15A	010317010	£49.98	£59.98
IBC20	12/24V	20A	010317012	£62.99	£75.59
IBC25	12/24V	25A	010317013	£79.98	£95.98
IBC40	12/24V	40A	010317014	£99.98	£119.98

PETROL & DIESEL PRESSURE WASHERS

PLS265B

FROM £269.00 exc.VAT £322.80 inc.VAT

Honda & Diesel engine models in stock

Model	Pressure BAR/Psi	Motor HP	Order Code	exc.VAT	WAS inc.VAT	inc.VAT
Tiger1800B	110/1595	3	050412202	£269.00	-	£322.80
Tiger3000B	200/2900	6.5	050412212	£379.00	£478.80	£454.80
PLS195B	180/2640	5.5	050411362	£479.00	-	£574.80
PLS220	230/3335	9	050410347	£639.00	£802.80	£766.80
PLS265B	225/3263	13	050411367	£698.00	£898.80	£837.60
PLS360	248/3600	13	050410375	£979.00	£1197.60	£1174.80
DLS360	248/3600	9	050410376	£1199.00	-	£1438.80

DIAGNOSTICS

Professional Engine Diagnostic & EOBD/OBD II Fault Code Reader

BEST SELLER

£79.98 exc.VAT £95.98 inc.VAT

CEOBDPRO
010911130

WHEEL DOLLY (PAIR)

● 603x370x150mm

AWD1
051310205

LOAD RATING: 500KG PER DOLLY

£63.99 exc.VAT £76.79 inc.VAT

SWIVEL, NON MARKING CASTORS

SANDBLASTERS

- Heavy duty steel construction sandblasters for the quick removal of surface rust, paint, dirt/grease etc.

FROM £169.00 exc.VAT £202.80 inc.VAT

INCLUDES SANDBLASTING GUN, DELIVERY HOSE, 4 CERAMIC NOZZLES AND SAFETY HOOD

Model	Tank Volume	Flow Rate Req.	Order Code	exc.VAT	inc.VAT
CPSB100B	32 litre	6-25 cfm	000510133	£169.00	£202.80
CPSB200B	63 litre	6-25 cfm	000510134	£209.00	£250.80

SOCKET SETS & WRENCHES

LIFETIME GUARANTEE

Top quality chrome vanadium steel

PRO360
040810766

- 18 Sockets 8-32mm
- Reversible ratchet
- Comfort grip handle

£29.98 exc.VAT £35.98 inc.VAT

BEST SELLER

HUGE RANGE OF RATCHETS, SPANNERS AND SOCKET SETS

Digital electronic torque wrench

- 1/2" drive size
- Chrome plated
- Soft grip handle

PRO237
040218237

£89.98 exc.VAT £107.98 inc.VAT

WELDING ACCESSORIES

HUGE RANGE

PRICE CUT NOW FROM £34.99 exc.VAT £41.99 inc.VAT WAS £44.39 inc.VAT

GWH7
010120709

AUTO DARKENING WELDING HEADSHIELDS

WIRE

PRICE CUT NOW FROM £5.49 exc.VAT £6.59 inc.VAT WAS £7.19 inc.VAT

010130460

GAS

FROM £13.99 exc.VAT £16.79 inc.VAT

010130140

BOTTLE JACK

5 TONNES

- Tough cast iron base with screw in components
- High quality polished steel ram

£24.99 exc.VAT £29.99 inc.VAT

CBJ5B
020112012

WARRIOR WINCH

UP TO 7938KG CAPACITY IN STOCK

FROM £89.98 exc.VAT £107.98 inc.VAT

Model	Order Code	exc.VAT	inc.VAT
20SPS12	020110281	£89.98	£107.98
25SPS12	020110296	£129.98	£155.98

20SPS12

1 TONNE STRUT SPRING COMPRESSOR

- Hydraulically powered, foot control operated device
- Adjustable spring retainers
- Springs up to 400mm diameter & 520mm in length
- Tough steel safety guard

£189.98 exc.VAT £227.98 inc.VAT

SSC1000G
020411030

DIESEL FIRED SPACE HEATERS

Ideal for fast efficient heating

BEST SELLER

- Extra-long run fuel tanks – up to 53 litres
- Variable heat output with thermostat control

FROM £179.00 exc.VAT £214.80 inc.VAT

XR80

◆ WAS £334.80 inc.VAT

Model	MAX output	Order Code	exc.VAT	inc.VAT
XR35	10kW	010410197	£179.00	£214.80
XR60B	14.7kW	010411103	£219.98	£263.98
XR110	29.3kW	010411006	£319.00	£382.80
XR80◆	20.5kW	010411004	£269.00	£322.80
XR160	46.9kW	010411008	£389.00	£466.80
XR210	61.5kW	010410210	£449.00	£538.80

PARTS WASHERS

FROM £59.98 exc.VAT £71.98 inc.VAT

CAR BEST BUY

CW2D

CW1D

‡ WAS £173.99 inc.VAT

Model	Tank Cap.	Type	Order Code	exc.VAT	inc.VAT
CW2D	10Ltrs	Bench	050810031	£59.98	£71.98
CW1D ‡	45Ltrs	Floor	050810030	£144.99	£167.98
CWM20	22.5Ltrs	Floor	050810020	£169.00	£209.99
CW40	75Ltrs	Floor	050810920	£219.00	£262.80

PTC CERAMIC FAN ELECTRIC HEATERS

FROM £29.98 exc.VAT £35.98 inc.VAT

BEST SELLER

DEVIL2800PTC-B

Model	Heat Output	Order Code	exc.VAT	inc.VAT
DEVIL 2000PTC-B	1-2kW	010415591	£29.98	£35.98
DEVIL 2800PTC-B	2.8kW	010415602	£49.98	£59.98
Devil 5000PTC	3.3-5kW	010415340	£72.99	£87.59
Devil 9000PTC	6-9kW	010415238	£129.98	£155.98

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BOLTON, BL3 6BD	01204 365799
BRADFORD, BD1 3BN	01274 390962
BRISTOL, BS5 9JJ	0117 935 1060
BURTON, DE14 3QZ	01283 564708
CAMBRIDGE, CB4 3HL	01223 322675
CARDIFF, CF24 3DN	02920 465424
CARLISLE, CA1 2LG	01228 591666
CHELTENHAM, GL52 2EH	01242 514402
CHESTER, CH1 3EY	01244 311258
COLCHESTER, CO1 1RE	01206 762831
COVENTRY, CV1 1HT	02476 224227
CROYDON, CR2 6EU	0208 763 0640
DARLINGTON, DL1 1RB	01325 380841
DEAL KENT, CT14 6BQ	01304 373434
DERBY, DE1 2ED	01332 290931
DONCASTER, DN2 4NY	01302 245999
DUNDEE, DD1 3ET	01382 225140
EDINBURGH, EH8 7BR	0131 659 5919
EXETER, EX2 8QG	01392 256744
GATESHEAD, NE8 4XA	0191 493 2520
GLASGOW, G4 9EJ	0141 332 9231
GLOUCESTER, GL1 4HY	01452 417948
GRIMSBY, DN32 9BD	01472 354435
HULL, HU9 1EG	01482 223161
ILFORD, IG2 7HU	0208 518 4286
IPSWICH, IP1 1UZ	01473 221253
LEEDS, LS4 2AS	0113 231 0400
LEICESTER, LE4 6PN	0116 261 0688
LINCOLN, LN5 8HG	01522 543036
LIVERPOOL, L3 5NF	0151 709 4484
LONDON CATFORD, SE6 3ND	0208 695 5684
LONDON EDM'TON, N18 020	0208 803 0861
LONDON LEYTON, E10 7EB	0208 558 8284
LUTON, LU4 8JS	01582 728063
MAIDSTONE, ME15 6HE	01622 769572
MC CENTRAL, M8 8DU	0161 241 1851
MC OPENSHAW, M11 1AA	0161 223 8376
MANSFIELD, NG19 7AR	01623 622160
MIDDLESBROUGH, TS17 6BZ	01642 677881
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2-seater Roadster Coupe

Part ONE: Martyn Knowles introduces this near 14-year-old MX-5 Mk3 NC we bought from the car auctions.

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CM project 2010 Mazda MX-5 2.0 Sport Tech

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Mazda's MX-5 first appeared in the UK from 1989. The Japanese carmaker took the good points from the 1970s MGB and TR7 designs and created a modern 2-seater open-top driving experience. Known as the NA first-generation, they did drive well. I do remember steering *CMs* project Mk1 to the Ace Cafe in London when we held *CMs* 50th Birthday at this location in 2008. I was taking roundabouts in a new fashion; the suspension was so good.

The NB Mk2 arrived in 1998, keeping the basic same shape but losing the pop-up headlights of the NA. Either a 1.6 or 1.8 four-cylinder was available in both the NA and NB. More power arrived in 2001 when variable valve technology for the 1.8 engine became standard.

Sales for the NA model were huge in the USA (almost half of the cars built), with sales fairly low in the UK at the beginning. It took us some time to get to hear about the driving experience. Sales started shifting here once the NB model appeared reaching a peak in 2003. News of the new NC Mk3 arrived in early 2005. A totally redesigned car, with chief designer being Moray Callum (who we mention on page 50 of this issue, as he was involved in the Ford Mustang design).

The NC was sold from November 2005 in the UK. It came with either a 1.8 or 2.0 four-cylinder 16v petrol DOHC engine – the 1.6 dropped. Mazda and Ford developed these engines together. The 2.0 is often referred to as the Duratec unit, however Mazda call it the MZR. Being rear-wheel-drive the engines are longitudinally mounted in the engine bay with a propshaft running though the centre of the floor pan. In a Mondeo for instance, being front-wheel-drive, the petrol engine is mounted transversely.

In 2009 a facelift appeared. Revised front bumper with bigger grille will tell you at a first glance. The 2.0 now had a 7500rpm redline, with slight interior trim updates.

The NC continued in production for 10 years, the ND arriving in 2015 and continues to be made today.

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Our car – YD60 ROU

My usual source of finding cars is British Car Auctions – our car was located at one of BCA's holding sites near Gatwick airport. Which isn't too far for me to collect. So, I bid on this 102,083 mile, 2.0-litre Sport Tech in Stormy Blue Mica paint. First registered on 'new plate' change day of September 1st, 2010. A June 2025 MOT came with this MX-5.

A guide price from the auction was set at CAP Clean of £3150. I prepared myself to bid and was rather surprised. I was the only bidder at the starting price of £1900 plus fees of £334.96. Total £2234.96. Not bad. But would it be driveable or would there be hidden rust? Time to find out…

I asked Sarah to drive us to the BCA site. I could see the Mazda in the distance – they knew I was arriving at the given time slot. BCA staff moved it closer to the exit gate, where I took over. First though, a check of engine fluid levels. The oil looked OK, there was coolant up to the 'max' mark and after firing the engine, it sounded perfect.

With a fuel station just outside BCA, after my initial checks, I thought it was OK to fill the tank with E5. First though, how do you open the fuel cap? Seriously, I had to Google that – you pull down the lockable trim between the two seats and you'll find an old-fashioned pull handle.

The Mk3 MX-5 NC was offered with either a 1.8- or 2.0-litre four-cylinder 16v engine. Our 1999cc engine is often called a Duratec unit – it shares most of its design with the Ford engine of the same capacity. Although Mazda call this unit the MZR. Power output is 160PS at 7000rpm. Making sure the engine oil at the correct level is important. If the level gets low and you go for a spirited drive, the lack of oil at high revs will ruin the bottom end. The oil in our engine was last renewed in 2022, some 8000 miles ago. A service is overdue and something I will conduct for the next issue's episode.

The drive home went well. I didn't open up the throttle to roughly 10 miles in. That was a strange experience, because I could feel through the seat of my pants that the rear-drive power wanted to push me into the nearside verge. Changing gear after full throttle was even more comical as the whole car straighten up on lift-off and went back to sending me towards the left on full acceleration again.

Worn tyres, shocks or suspension bushes went through my head after that experience. It didn't spoil my drive though, as the NC still has quick reactions in the steering department. In and out

In 2006 Mazda offered alongside the already existing soft-top cloth roof model, an electric retractable hardtop – also known as the PRHT. With this fitted option it gave us a new model name – the MX-5 Roadster Coupe.

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of roundabouts is done without fuss and the six-speed gearbox, although a bit notchy in 3rd, is sleek enough. Redline is a massive 7500rpm, although I've not sent the engine spinning that fast yet – not before an oil and filter change at least.

We arrived back after 35 miles without a problem. Coolant temperature stayed steady, engine didn't misfire – and four weeks on, we've now covered 150 miles.

I have a local MX-5 restorers down this way, called **The MX5 Restorer** (**www.themx5restorer.co.uk**). They offer all mechanical and bodywork repairs to every MX-5 model. They also fabricate metal panels too. I went to see them not long after buying our NC car. Chris and Garath run the business, and mentioned to me that they offer customers (and potential customers) a free look-over of their MX-5s on a Saturday morning to go through any potential problems. I asked if they didn't mind doing this to the *CM* project so I could get to look underneath and get some pictures taken. No problem they said. As you can see, our car is in a great shape for its age.

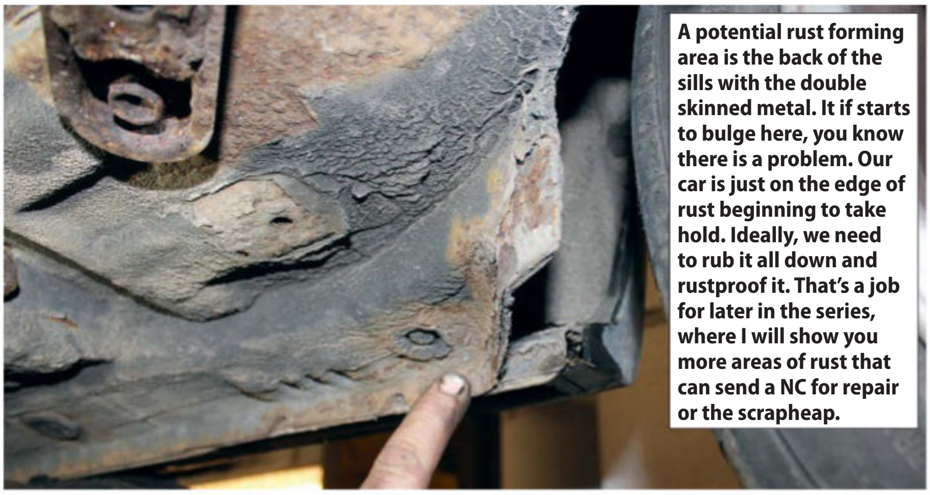
Bizarrely on the next ramp to where we did the inspection of YD60 ROU sat another 60-plate NC, with back wheelarches and the back of the sills cut out ready to accept new metal. I'm unsure why our car has never been welded or needs welding, and this same-aged car does. Maybe low-mileage cars suffer rust issues more, where the rainwater collects and sits without regular usage?

Thanks to Roy who carried out an inspection report on our project MX-5 with me at The MX5 Restorer. I also gave him the pleasure of operating the hardtop for the first time in our hands. I need not have worried, it dropped down perfectly.

Service history

Our car came with a 'replacement service record' book with five stamped services starting at 48,825 miles in 2014. The original service book must have been mislaid during ownership changes. In 2015 it was serviced at 52,788, 2016 at 57,384, 2017 at 62,869 and 2019 at 69,510. The last change of keeper was in 2019, so I'm guessing it was serviced before the ownership change. The last owner has, therefore, added around 32,000 miles in just over four years.

So far, I'm pleased with our purchase. I will be happy once I've drained the oil and fitted new filters. Incidentally, the NC doesn't have a cabin filter. You can certainly smell the environment with the roof down, fumes and flowers at this time of the year.



A potential rust forming area is the back of the sills with the double skinned metal. It if starts to bulge here, you know there is a problem. Our car is just on the edge of rust beginning to take hold. Ideally, we need to rub it all down and rustproof it. That's a job for later in the series, where I will show you more areas of rust that can send a NC for repair or the scrapheap.

I prefer the look of the painted colour-coded hardtop over the soft-top alternative. The power-operated roof takes 12 seconds to fully open from its closed position. And it doesn't fold into the boot space area, which of course, many convertible roofs do.

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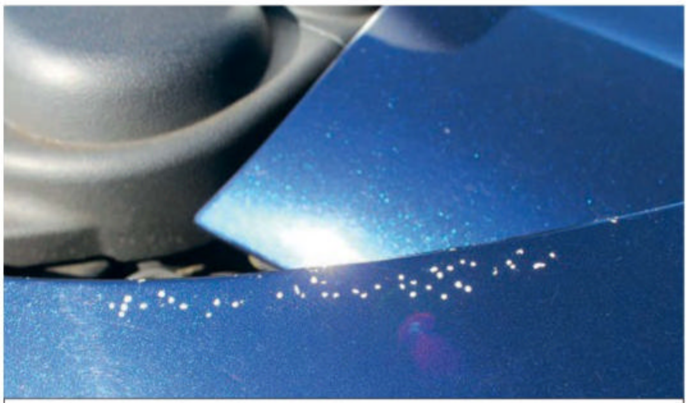
TECHNICAL SPECIFICATIONS

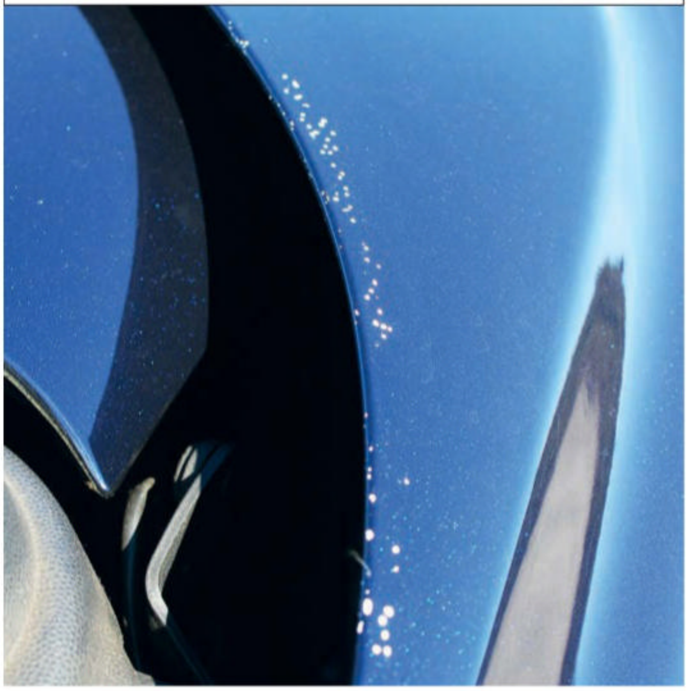
Model	**1.8 5-speed**	**2.0 (6-speed)**	**2.0 PowerShift**
Cubic capacity	1798	1999	1999
Max output (PS/rpm)	126 @ 6500	160 @ 7000	160 @ 6700
Max torque (Nm/rpm)	167 @ 4500	188 @ 5000	188 @ 5000
0-62mph	9.9	7.6 (7.9)	8.5 (8.9)
Top speed (mph)	121 (123)	132 (136)	119 (121)
Fuel consumption (mpg)			
Urban	29.7	28.0 (26.9)	25.9
Extra Urban	51.4	48.7 (47.9)	46.3
Combined	40.4	38.2 (37.2)	35.8
CO2 emissions (g/km)	167	177 (181)	188
Fuel tank capacity	50	50	50

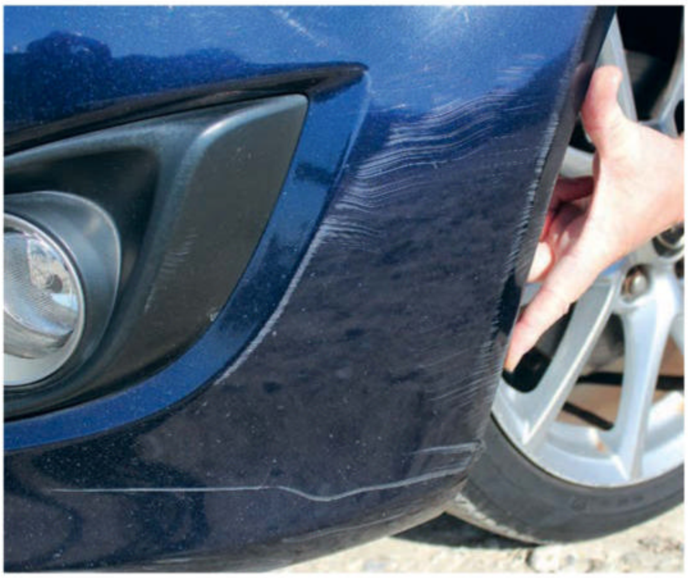
Figures in brackets relate to the heavier Roadster Coupe Sport Tech model.

Tyre pressures looked OK. However, when I checked them using a new Ryobi tyre inflator, it was found that the readings were: RF 28psi; LF 31psi; RL 29psi and RR 24psi. On the door stamp, 29psi is given for all tyres at all speeds. You must keep your fingers on the Ryobi tool to keep it running, and I found that using the supplied gauge, to go 2psi over the intended target. It would then settle back. That said, I did use two other tyre pressure reading tools – they all gave different read-outs.



Most of the NC cars I looked at during my auction search had this type of paint defect around the edge of the rear deck area – here the roof is down. I mentioned this to the MX5 Restorer guys in East Sussex and they tell me that the panel is made of a composite material. You can paint this panel but there's no a guarantee that the same blemish won't reappear in the not-too-distant future.





The nearside front bumper has taken a knock. There's also a touch-up paint job at the top of the bumper into the front wing. I didn't spot it until the sun was shining at it, someone has done a decent job. With this bumper scrape, I'm going to polish it out first to see how good I can get it before thinking of any paint repair.

BCA showed this sticky area in their images (right). All I kept thinking was there might be a leak in the roof. But once seen with my own eyes and experiencing the problem, it all became clear. The sun visor was dropping down on braking or heavy potholes, hindering my vision of the road ahead. It was BluTack. So, for the moment I've added my own BluTack to stop it falling unintentionally. Ingenious!

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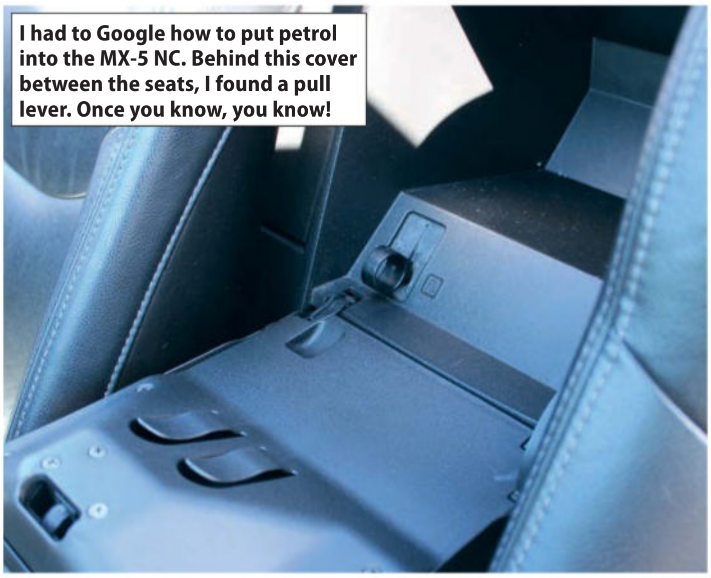
A Bose radio/CD system is fitted. It works OK, you can change stations, fit an Aux cable, play a CD – the only thing wrong, there's no sound from the speakers. My head says amp problem. And I think it's located behind one of the seats – does anyone know for sure – or come across this before?



I had to Google how to put petrol into the MX-5 NC. Behind this cover between the seats, I found a pull lever. Once you know, you know!

DETAILED LINE-UP

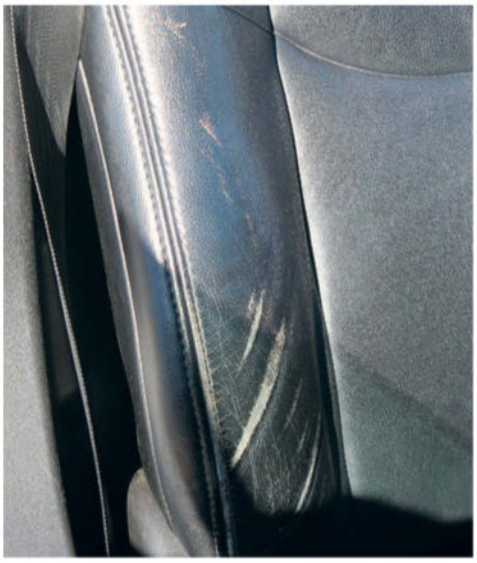
In 2010 you could choose from two models – SE or Sport Tech. A PowerShift 6-speed automatic was another choice based on the Sport Tech spec.

1.8i SE
5-speed manual.
PAS and ABS.
16in alloys with 205/50/16 tyres.
Sports seats.
Stainless steel scuff plates.
Dual front airbags.
Remote entry with boot release.
Trip computer.
CD audio unit with AM/FM radio, six speakers, aux input jack.
Integrated steering wheel audio controls.
Electric windows with one-touch.

2.0i SE
As 1.8i SE plus:
Dynamic Stability Control (DSC) with Traction Control (TCS).
Limited Slip Differential (LSD).
Side airbags.

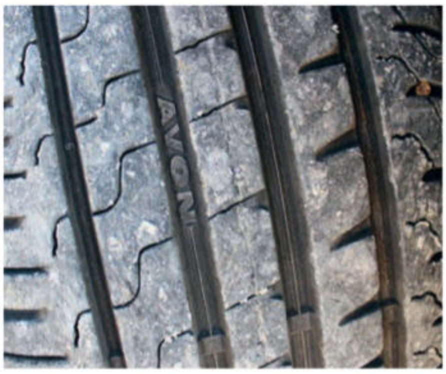
2.0i Sport Tech
As 2.0i SE plus:
Sports suspension featuring Bilstein dampers and strut tower bar.
6-speed manual.
Front fog lights.
17in alloy wheels with 205/45/17 tyres.
Leather trim with 5-stage seat warmer.
Climate control air-conditioning.
Bluetooth connectivity.
Premium Bose audio system with 6 CD changer, AM/FM radio, seven speakers, aux input jack.
Cruise control.
Brushed aluminium-effect style bar cladding.

2.0i Powershift
As 2.0i Sport Tech but gearbox changes to:
6-speed sequential paddle-shift transmission with full auto mode.



USEFUL CONTACTS

bilstein group partsfinder
partsfinder.bilsteingroup.com
The MX5 Restorer (East Sussex)
www.themx5restorer.co.uk



The driver's leather seat has these scuff marks. I will work out what is the best way to rectify this – either a DIY repair or professional. *Right:* the front tyres are Avon ZX7s. Both have 6mm of tread, but we noticed cracks forming between the grooves. I've seen this situation on the Avon's fitted to my Skoda Octavia – and you've probably noticed it too on other tyre makes.

Climate and heated seats in the Sport Tech models. Plus, a 6-speed 'box. The gear knob can be bought new (OE), but the price is around £175. We will look for an alternative.

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Focus Mk3

Part THREE: James Burr renews front brake discs and pads.

HELPFUL TOOLS

- 7mm Hex key/socket
- Torque Wrench
- Water pump pliers

TORQUE SETTINGS

Caliper mounting bracket (carrier) to hub	120Nm
Caliper to bracket (caliper guide bolts)	28Nm
Road wheels	135Nm

It goes without saying that effective braking is crucial on any car. But, the frequency of needing replacement parts will always depend on the particular vehicle and how it's driven. It's obvious that brake pads (and a little less often brake discs) are important consumables that will be changed multiple times over the life of any vehicle. It's also commonly acknowledged that they should be inspected by owners regularly and not to wait for each MOT. But, in the real world, it's actually the city cars and performance models that usually require the most regular replacements, due to the nature of how they're used.

In the case of our Focus EcoBoost, there's no doubt that it makes an ideal city car (being ULEZ compliant also helps its case here). But the Mk3 is also a reasonably heavy vehicle and it means that, during city-style stop-start driving, the brakes can take quite the battering. In fact, we found that many of the cars on the market right now are in need of new pads, and that's at the very least. Always a great bargaining chip when looking for any new vehicle. The good news is that replacing brake pads and brake discs is a relatively straightforward job.

It's also true of the Focus that the front brakes do almost 80% of the work, and the rear (which are actually drums on our 1.0 EcoBoost) are more for stability than outright stopping power. So, even if it's just for peace of mind, the front brakes are always the best place to start.

When it comes to faults, assuming that good quality replacement parts have been used, and the brakes have not been allowed to wear out fully, braking problems are rare on the Focus. If you're buying a second-hand Mk3 (any variant) and there's any juddering or metal-on-metal graunching when you brake normally, this is a good indication of the condition of the car and may point to one of two things. First, the car could have been neglected and the brake pads could be extremely low on friction material. Or second, the car could have been driven extremely hard causing overheating and warped discs.

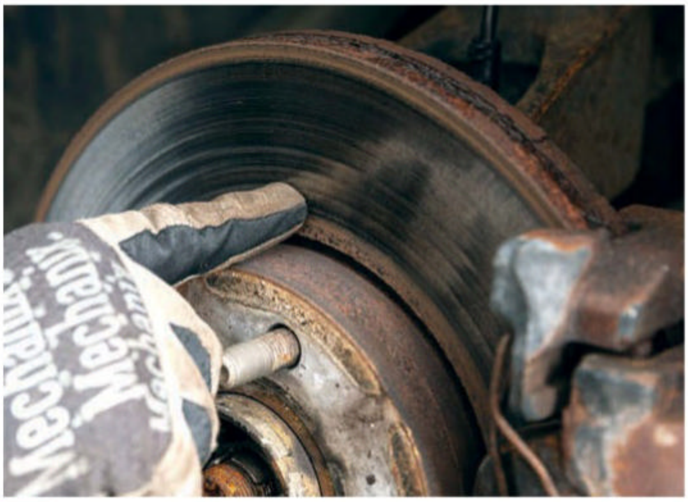
Finally, there's the question of the parts. Always look for replacements from a reputable manufacturer and supplier. This is not only because each variant seems to have a different sized disc (278mm, 300mm and 320mm depending on the model), but mostly because some cheap aftermarket items have been reported to cause juddering due to low quality materials.

The following guide shows how to fit new pads and discs – or just the pads if your discs remain in good condition…

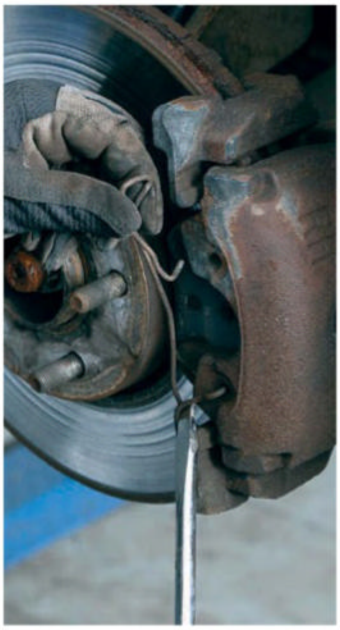
FRONT BRAKE DISCS & PADS

1 ◀ Remove the brake fluid reservoir cap. This is located on the left-hand side of the engine bay. Removal will relieve the pressure on the system when you push back the caliper pistons later. Gloves should be worn for all steps as brake dust and brake fluid is corrosive.

2 ▶ Jack the front of the car up safely and secure on axle stands. Remove the road wheels.



3 Now the brake discs and pads can be inspected for wear. Even if the intention is simply to replace pads it's important to inspect the discs for signs of surface scoring and corrosion. It's also advisable to check the thickness of the disc, a raised lip on the outer edges often indicates the need for replacement. New discs are 25mm in thickness and should not be allowed to drop below 23mm. A main dealer will use a micrometre to measure the thickness, but any raised lip – or a friction surface that isn't entirely flat - should give a good indication of how worn the discs are.

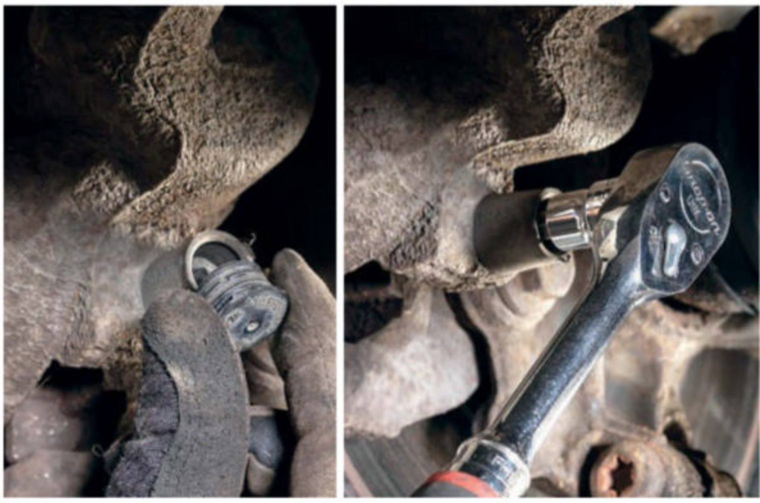


4 Remove the caliper retaining spring – this can be carefully prised away from the caliper using a flat-blade screwdriver or pry bar.

TYPICAL COST

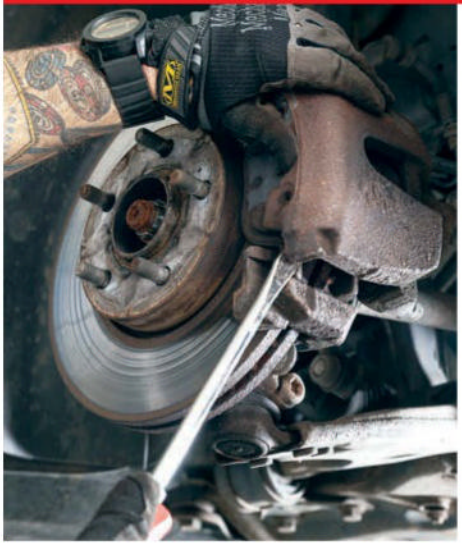
▶ febi **24565** Brake Discs (pair) **£56.26**

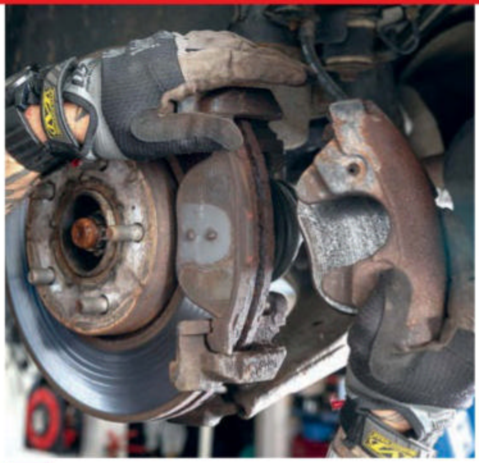
5 As with most Fords the brake caliper is removed from the assembly from the rear using a 7mm Allen (Hex) key. Note that these aren't commonly supplied in every socket set. Specialist tools are available specifically for this purpose.

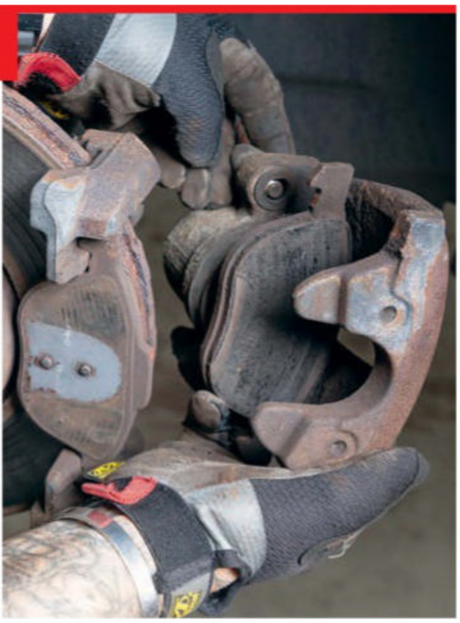


6 Remove the two rubber bungs from the rear of the caliper, and loosen the two caliper guide bolts underneath. These have a small thread that holds the caliper to the bracket which needs to be undone for removal, there's no need to fully remove these bolts from the caliper.

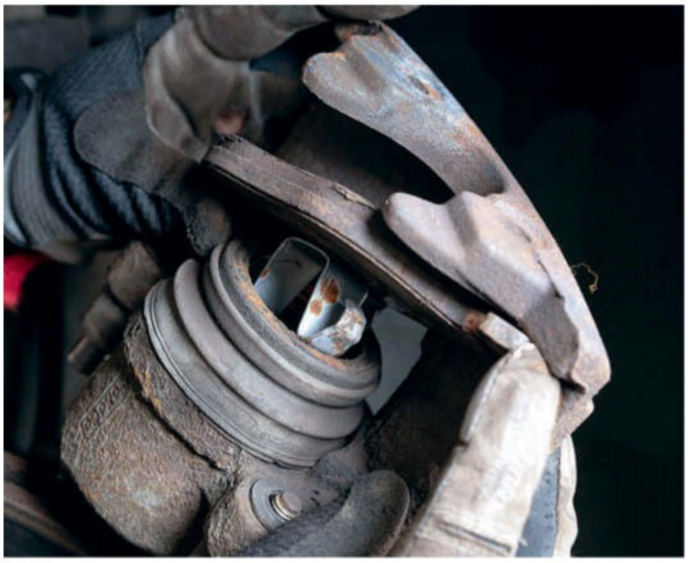
FRONT BRAKE DISCS & PADS CONTINUED



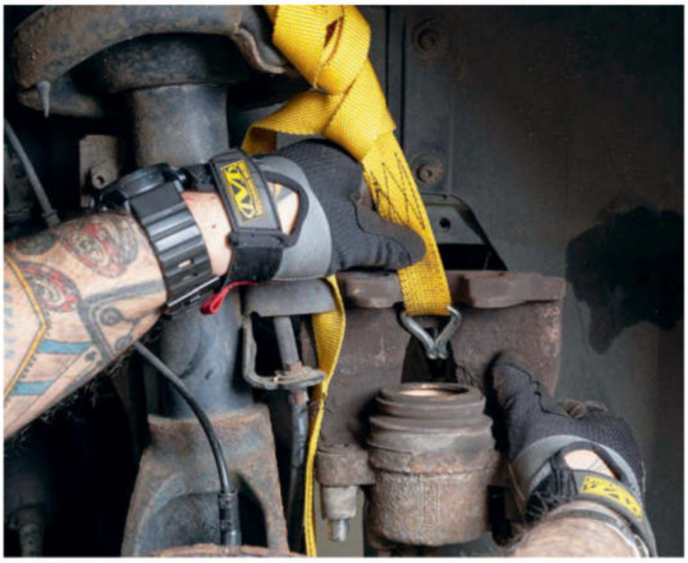




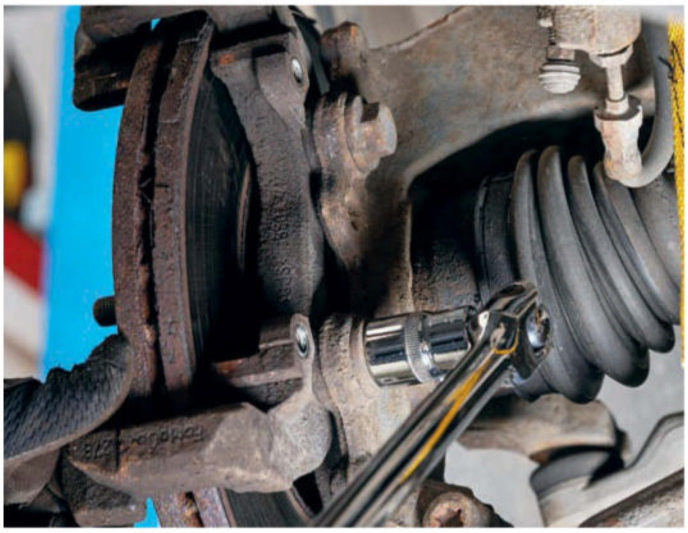
7 ◀▲▶ Prise the caliper free of the carrier (caliper mounting bracket) at the bottom and remove.



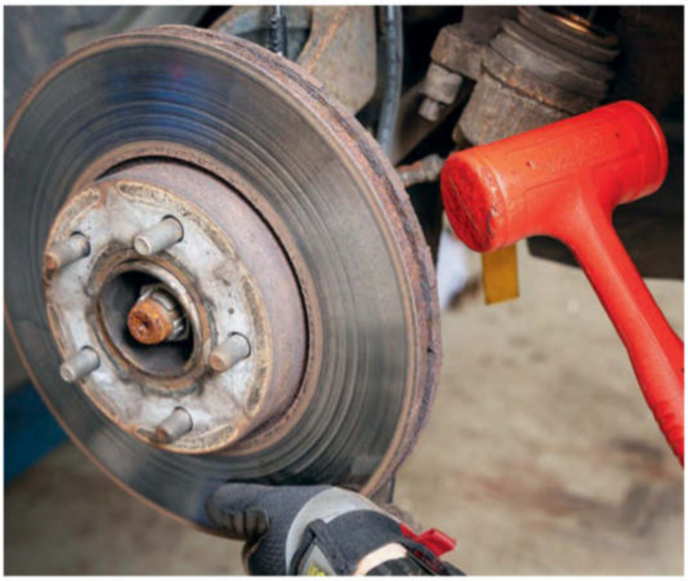
8 While holding the caliper, remove the front pad from the carrier and the rear pad from the caliper piston. If you're not replacing brake discs, new pads can now be installed by skipping to Step 16.



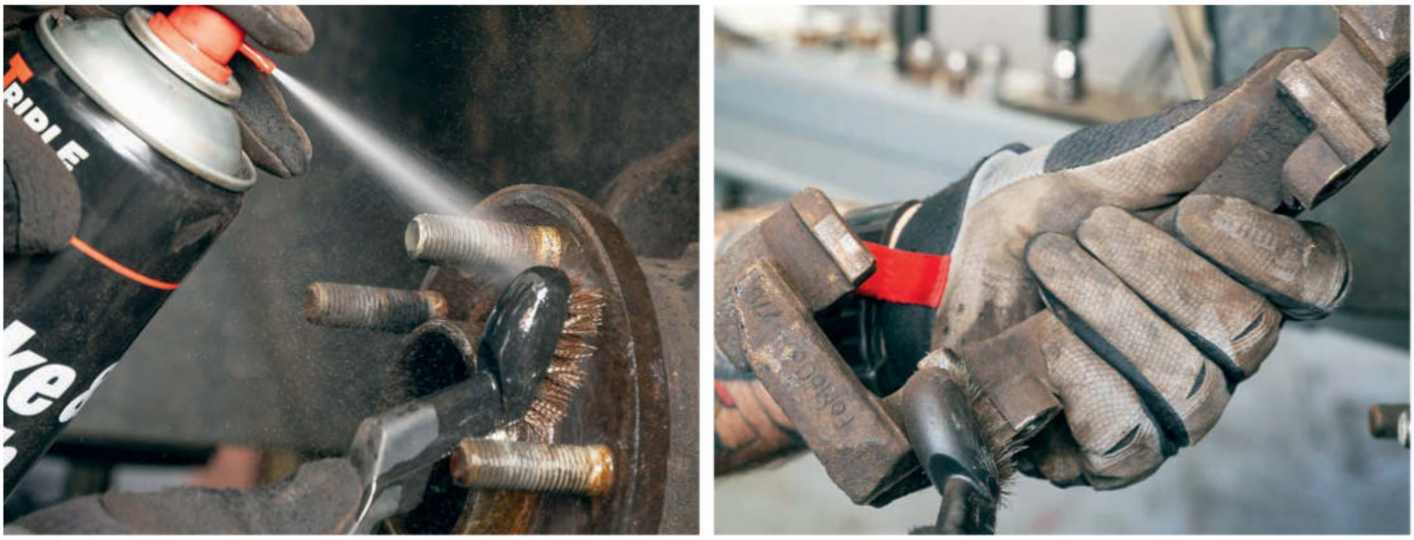
9 Never leave your calipers hanging from rubber brake hoses as this can cause damage to the hoses and fittings. Instead secure your caliper to the suspension leg using a strap, rope or a bungee.



10 To remove the disc, first the carrier must be removed. Again, access is from the rear. Loosen both the carrier securing bolts, before removing them fully. Note: These should be tight so a long breaker bar may be needed for removal. Wiggle the carrier out of position.

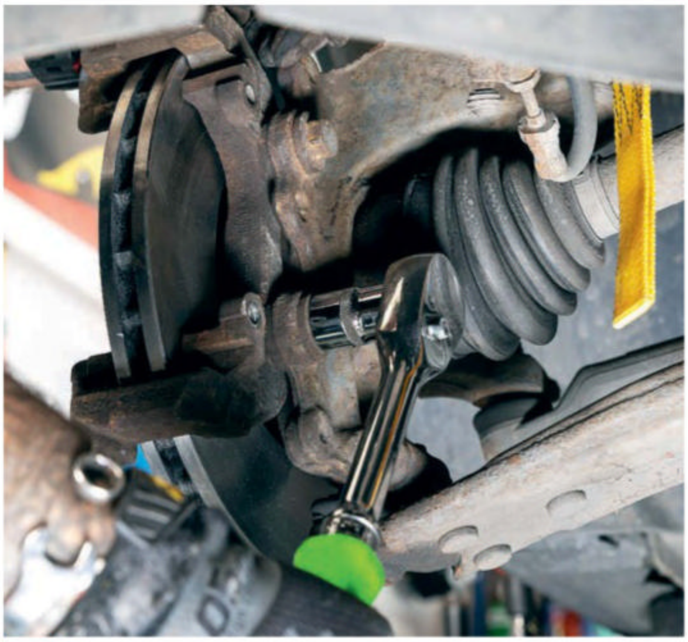


11 The brake disc can now be removed. In most cases this will likely require a tap with a hammer to loosen it from the hub.

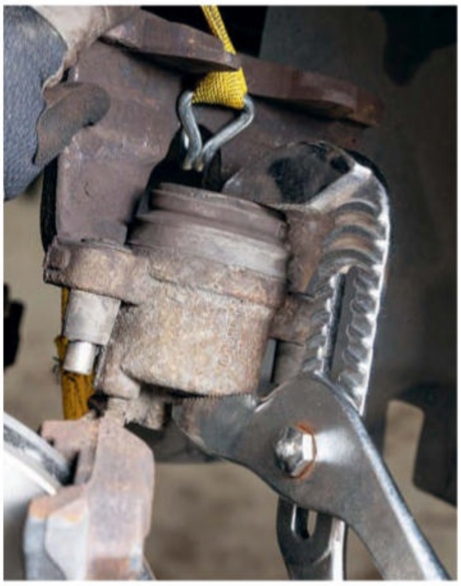


12 Clean up the hub surfaces using brake cleaner and a wire brush, this is to ensure that no corroded metal or built-up brake dust stops the new disc sitting flat on the hub, eliminating the chance of run-out (or excessive disc wobble). Use the same method to clean up the carriers, paying particular attention to the pad recesses. Note: Do not breathe in any brake dust removed from these areas, brake dust is corrosive.

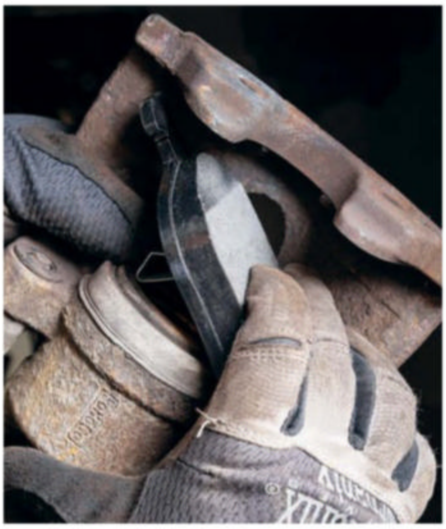
13 The vast majority of discs are treated with an anti-corrosion coating to stop them rusting while in storage. Not all, so check the instructions. Ours did, so before installing, we cleaned the friction surfaces using brake cleaner. Removal of this oily substance on both sides only requires a spray and a wipe. Slide the disc onto the hub.



14 Now the carrier can be reinstalled, slide into place, install the two 18mm bolts, and torque to 120Nm.



15 ◀▲ Push back the piston into the housing using large water pump pliers or a G-cramp. Specialist caliper piston tools are available, but not always necessary in this instance. On a healthy caliper with no corrosion the piston should slide back smoothly all the way into the housing.

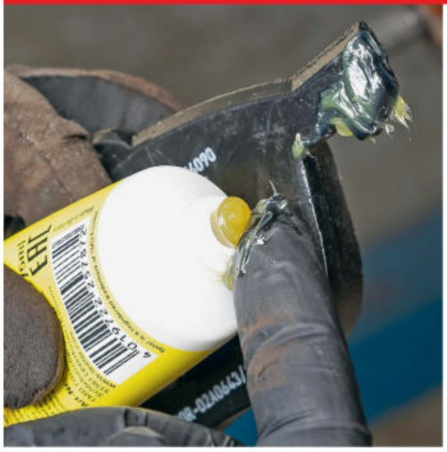


16 Install the new rear (inside) pad by clipping it into the piston.

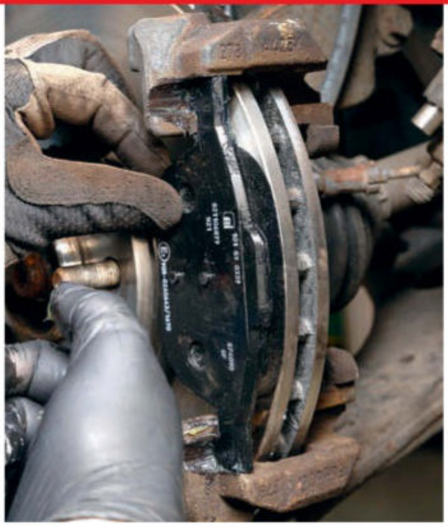
TYPICAL COST

▶ febi **16479** Brake Pads Set **£18.10**

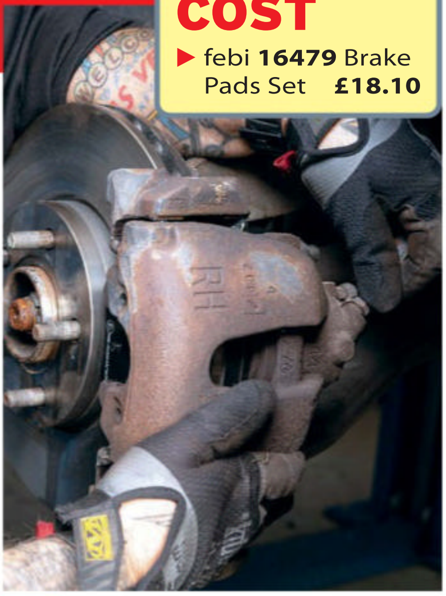
FRONT BRAKE DISCS & PADS CONTINUED



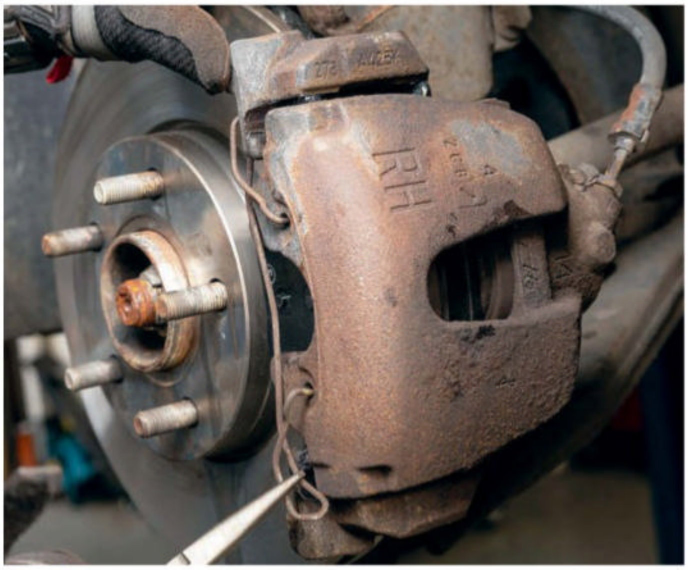
17 To eliminate squealing when in use, lubricate the corners of the pads (where they meet the carriers) using a suitable anti-seizing compound such as Ceratec or copper grease. This process must be carried out on both pads. Note: Never lubricate the friction surface of the pad or the disc.



18 Install the new front (outer) pad and slide the caliper into place ensuring that the rear pad corners sit snugly in the corresponding carrier recesses.



19 Push the caliper guide bolts back into place and tighten them both until they seat using your 7mm Hex key. Finally torque each bolt to 28Nm.



20 Reinstall the caliper retaining clip using pliers. In most cases a light tap with a hammer after will ensure that they're firmly seated in place.

21 Reinstall road wheels ensuring they are torqued to 135Nm after the vehicle is lowered to the ground. Refit the reservoir cap and press the brake pedal a couple of times to reseat the new pads.

WHAT IS BEDDING IN?

▶ New brake pads require 'bedding in' over the first 100-miles or so. This process maximises performance in the long run by making sure the friction surfaces on the pad are mated perfectly to the disc, effectively increasing their contact area. Slow, progressive braking is the key to breaking in your new pads – heavy braking from high speeds or significantly increasing the weight of the vehicle (by overloading or towing trailers) presents the risk of overheating, which can permanently change the friction material for the worse.

The bedding in process also enhances performance by transferring some of the fiction material from the pad to the disc to make them more 'grabby'. This helps both to work together more effectively. Friction material must be distributed gradually and evenly to prevent any judder (which can often be misconstrued as a warped disc).

Some high-performance, fast-road and racing brake pads have their own specific bedding-in procedure, for example 20 stops from 80-30mph. But, in the case of standard discs and pads, just avoiding heavy braking and opting for light, progressive braking for the first 100-200-miles should be sufficient to bed in the pads effectively.

WIN WIN WIN WIN WIN WIN

Win Clarke

CAR MECHANICS COMPETITION

Pressure Washer

CLARKE HARRY 2 HOT WASH HIGH PRESSURE WASHER 145 bar (2103psi)

This highly compact portable hot and cold high pressure washer is great for really effective cleaning of vehicles, caravans, bikes, patios, etc.

With a hot jet of high pressure water, this unit rapidly dissolves dirt or grime with ease. Combined with its economical diesel-powered water heating system, it is ideal for when time is of the essence.

The Harry 2 is provided with an extra-long 8m high pressure hose, fitted with a hose and lance holder, combined with handy wheels for easier movement and includes a 300ml detergent dispenser bottle.

Clarke
HARRY
2
HOT WASH

1 PRIZE WORTH OVER £694

SPECIFICATIONS

- 145 bar maximum pressure
- 7.5 litres/min maximum flow rate
- 868mm assembled gun and lance length
- Adjustable pencil jet and fan spray nozzle
- Extra long 8 metre high-pressure hose
- Hose and lance holder for tidy storage
- Large diameter wheels for easy movement
- Includes 300ml bottle for detergent
- Dimensions (LxWxH): 520 x 410 x 767mm

Product weight : 26.45kg

HOW TO ENTER: Entry is free **ONLY ONE ENTRY PER HOUSEHOLD PLEASE.** Follow the instructions below. No correspondence can be entered into. The first correct entry chosen at random will win a Harry 2 Hot Wash. **Closing date for entries is April 28, 2025. Results will be published in the June 2025 issue – due out May 16.**

RRP £694.80 including VAT

To enter this competition simply go to the website below and input your details – or use the QR code

Please visit our website

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Type the above into a browser address line and NOT a search engine

Car Mechanics *magazine will only use the data you supply on your entry to contact you if you are the winner. The winner's details will be passed on to Clarke International Ltd for the sole purpose of organising the delivery of your prize. All competition entries will be held securely until the prize draw has been made and then securely disposed of within seven days of the winners being chosen. The winners' details will be held for a period of one month until the prize has been dispatched and received, then they will be securely disposed of.*

Product Test

Rob Hawkins puts products through their paces

OIL FILTER REMOVAL TOOLS

CONTACTS

Car Builder Solutions
01580 891309
www.carbuilder.com

Draper
023 8049 4333
www.drapertools.com

Halfords
0330 135 9779
www.halfords.com

Laser Tools
01926 815000
www.lasertools.co.uk

Machine Mart
0115 956 5555
www.machinemart.co.uk

Screwfix
www.screwfix.com

Sealey Tools
01284 757500
www.sealey.co.uk

With such a vast assortment of different types of oil filter removal tools, Rob divides them into ten different groups to decide which ones are the best.

THANKS TO
The Motorist
(help with photography and testing)
01977 233200
www.themotorist.com

Undoing a spin-on oil filter during an engine oil service can turn into one of those moments of dread that can potentially stop a job in its tracks. Typically, the oil filter may be hidden away down the back of the engine with little space to fit a tool to undo it. And even if you manage to fit something onto it to slacken it, you'll probably be left swearing and wondering why the last person thought it was sensible to seemingly tighten the filter to what feels like 100Nm.

There are numerous tools available to help undo an old spin-on oil filter, but is one of them better than the rest? Not really. The range of tools can be divided into ten main groups, and they all have their uses that are dependent on space and accessibility. We recommend investing in at least two or three of these. And shopping around for the best deals – our prices are in many cases only a guide.

At the budget end of oil filter removal tools, there are three main types, which consist of either a chain, fabric strap or metal band to wrap around an oil filter to help undo it. The quality, sophistication and cost of such tools can be higher, but this is generally where you'll find a choice of entry-level options from upwards of a fiver. Having at least one of these is worthwhile.

There's a large assortment of oil filter removal tools that consists of pliers of varying designs. If there's enough room to fit them, then they can be one of the quickest and simplest means of undoing a spin-on oil filter – providing there's enough space to the side of the oil filter to secure the pliers to it and you can get your hands around the ends of the pliers to securely grip and undo the filter (self-locking pliers are much easier to use).

A three-legged oil filter removal tool is, in our opinion, one of the best for getting you out of trouble. Most have adjustable legs, helping to cater for a variety of sizes of oil filter. When undoing the filter with a ratchet or spanner, those legs dig in and grip the filter. If it's too tight, they usually start to crush the sides of the filter but offer a good level of grip.

Providing there's the space to fit a three-legged oil filter removal tool onto the end of a spin-on oil filter, we recommend having one of these in your toolbox. There are some alternatives, such as one from Laser (part number **4496**) with a pair of spring-loaded ratcheting jaws (expect to pay around £32) and a ratchet mechanism.

All the tools mentioned so far cater for a range of sizes of spin-on oil filter (although some pliers have a fixed diameter), whereas a cap or cup is another tool we're looking at, but each one is only suitable for a specific size. Similar to investing in a large socket for a particular job, a cap/cup may be the answer, and it can offer the best means of undoing a spin-on oil filter.

There are many more types of oil filter removal tools, so we've had to draw the line somewhere and focus on the most popular from suppliers and manufacturers including Car Builder Solutions, Clarke (Machine Mart), Draper, Halfords, Laser, Screwfix and Sealey.

Chains

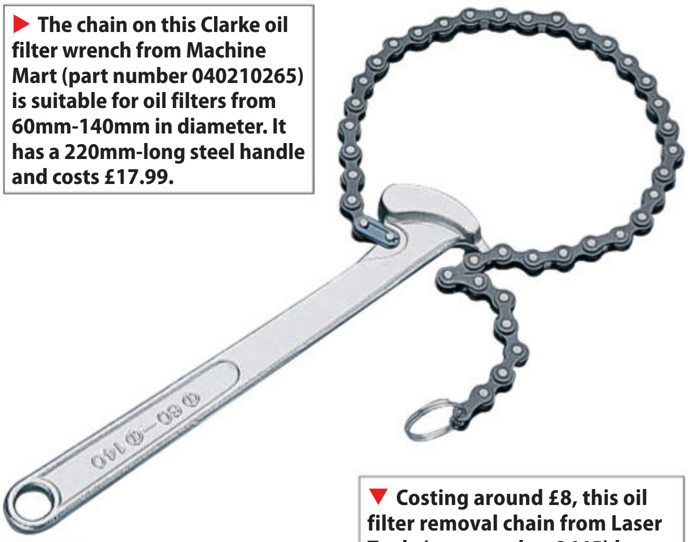
▶ It may look like a bicycle chain, but when it's wrapped around an oil filter to undo it, this isn't a bad idea. One of the cheapest has an adapter attached in which to fit a ratchet drive (½in usually) or a spanner to tighten the grip of the chain around the oil filter and attempt to undo it.

We've been using this type of oil filter removal tool for around 30 years. Expect to pay between £6 and £15 for one. It can be fiddly to use, having to wrap the chain around the filter and wind up the excess to get a grip and undo it. If the filter refuses to undo, then the force applied by the metal chain can crush the filter a little, in which case you will definitely need to remove it. And there's a limited amount of grip from the chain, so if it or the oil filter is contaminated with dirt or grease, it will probably slip.

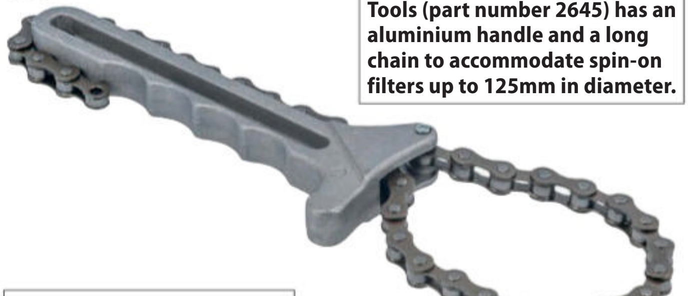
An adjustable oil filter chain wrench is a step up from the aforementioned chain and spanner/drive attachment. This consists of a handle with a chain attached to it. The chain is wrapped around an oil filter and hooked back onto the handle to form a loop. The leverage of the handle helps to undo the oil filter.

This design of an oil filter removal tool can be very cheap to buy. Sealey, for instance, produces one with a plastic handle for a mere £5.40 (part number **AK6410**) and Draper has one with a steel handle for £5.99 (part number **77584**). For less than two quid more, there's a similar tool from Laser that has an aluminium handle (part number **2645**). Although you may prefer the look and feel of Clarke's 220mm-long steel-handled tool that costs £17.99 (part number **040210265**). And Laser's self-locking pliers with a chain attached (part number **3794**) are a step up for around £25.

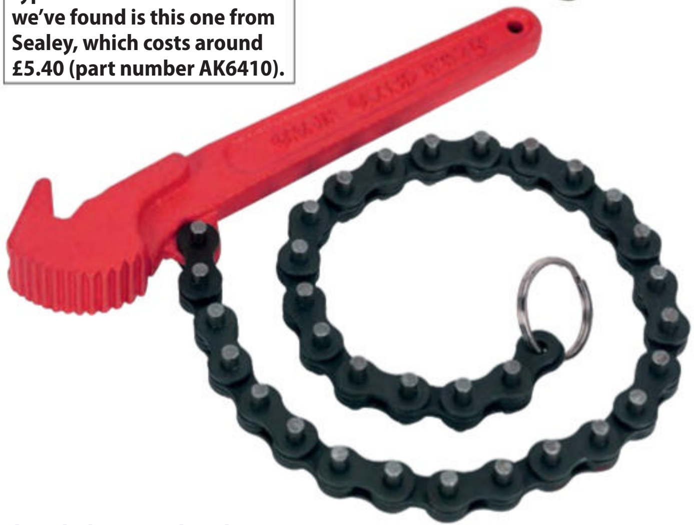
If you want something a little more sophisticated from a chain-type oil filter removal tool, then one with a double chain and pivoting (angled) handle may be more tempting. In some cases, the excess chain is fed through the tool, whereas others have an automatically adjustable loop, although this often means it caters for a smaller range of filter sizes (diameters). Budget for around £35-£50.



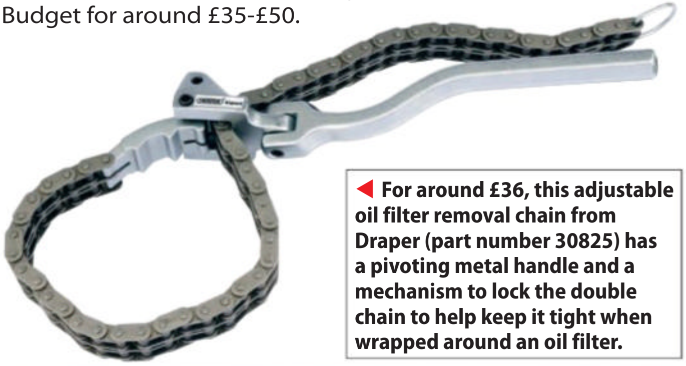
▶ The chain on this Clarke oil filter wrench from Machine Mart (part number 040210265) is suitable for oil filters from 60mm-140mm in diameter. It has a 220mm-long steel handle and costs £17.99.



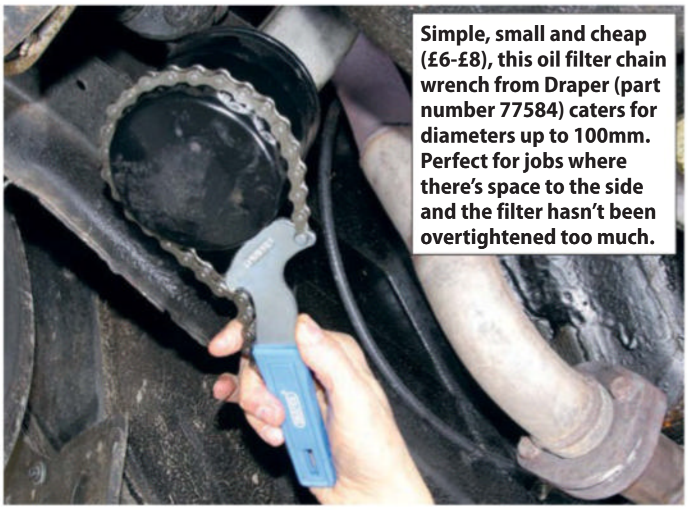
▼ Costing around £8, this oil filter removal chain from Laser Tools (part number 2645) has an aluminium handle and a long chain to accommodate spin-on filters up to 125mm in diameter.



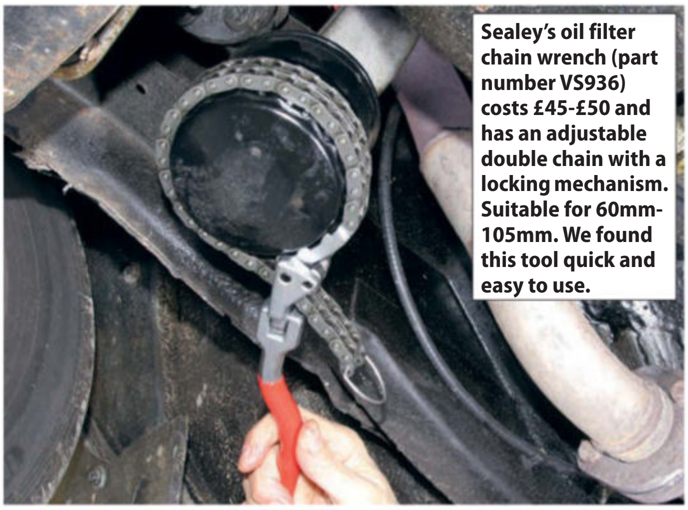
▼ One of the simplest chain-type oil filter removal tools we've found is this one from Sealey, which costs around £5.40 (part number AK6410).



◀ For around £36, this adjustable oil filter removal chain from Draper (part number 30825) has a pivoting metal handle and a mechanism to lock the double chain to help keep it tight when wrapped around an oil filter.

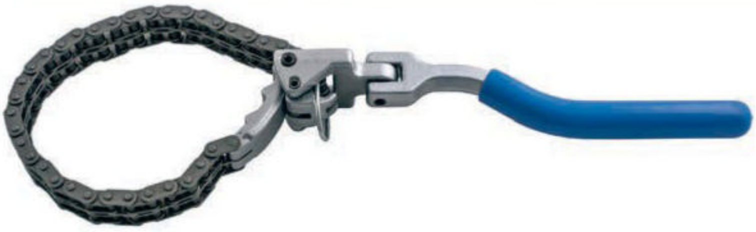


Simple, small and cheap (£6-£8), this oil filter chain wrench from Draper (part number 77584) caters for diameters up to 100mm. Perfect for jobs where there's space to the side and the filter hasn't been overtightened too much.



Sealey's oil filter chain wrench (part number VS936) costs £45-£50 and has an adjustable double chain with a locking mechanism. Suitable for 60mm-105mm. We found this tool quick and easy to use.

Chains *continued*



With a looped double chain that caters for filters from 60mm to 105mm, this oil filter removal tool from Laser (part number 5088) costs around £55.

halfords
Oil Filter
Wrench

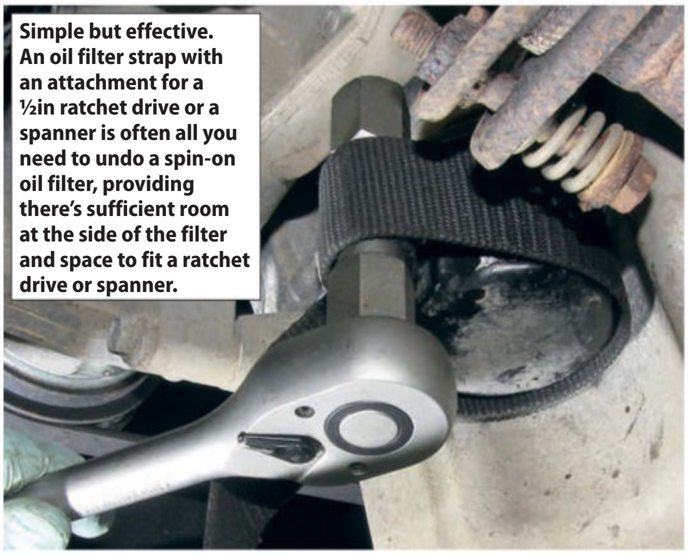
Available from Halfords for £7.99, this oil filter removal chain requires a ½in ratchet drive or a 24mm spanner to slacken an oil filter.

Straps

▶ One of the simplest and cheapest designs of oil filter removal tool, often consisting of a fabric strap that is wrapped around an oil filter and undone with either the tool's own handle or a separate ratchet drive or spanner (via an adaptor attached to the strap). It's essential to keep oil away from the fabric strap because once it gets contaminated, there's less chance of it gripping an oil filter to undo it.

Sealey's strap at under £8 (product code **AK640**) requires a ½in square drive ratchet or a suitable spanner to undo an oil filter, and there are numerous similar products from the likes of Laser Tools, Clarke and Draper, with prices ranging from £4.99 to £25.

A strap with its own handle is another variation of this type of oil filter removal tool, and some are just as cheap as the aforementioned ones. The excess strap is looped through the end of the handle and locked. The leverage of the handle helps to undo the oil filter. Prices start at £4.99 for Draper's oil filter strap wrench (part number **13771**) but can go up to £37.99 for Teng's version from Halfords (part number **253691**) and over £60 for another one from Draper (part number **23759**). The price differences depend on the quality of the strap and whether it has a handle.



Simple but effective. An oil filter strap with an attachment for a ½in ratchet drive or a spanner is often all you need to undo a spin-on oil filter, providing there's sufficient room at the side of the filter and space to fit a ratchet drive or spanner.

▼ For around £20, this oil filter removal tool from Sealey (part number AK6404) uses a strap and a steel handle to wrap around a spin-on oil filter to slacken it.

▲ With a long nylon band, the excess is fed through the double drive on this oil filter removal tool from Machine Mart's Clarke range (product code 040210245). At £16.79, it's not at the budget end, but can be used with a ⅜in or ½in ratchet or a 21mm spanner or socket.

Screw thread bands

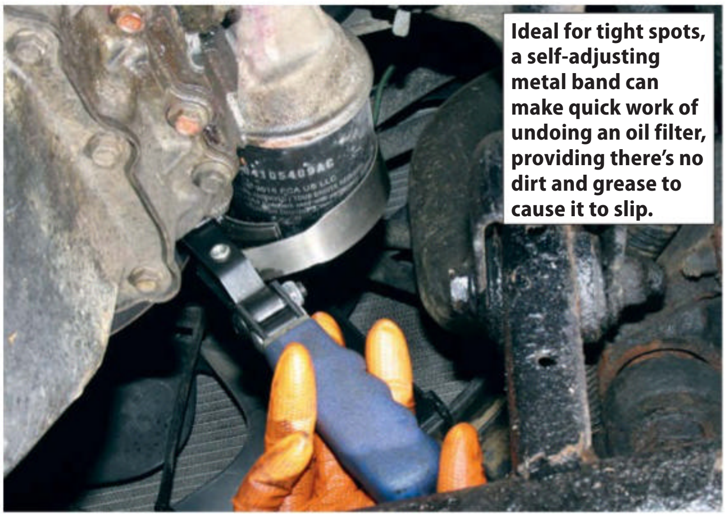
▶ A popular entry-level oil filter removal tool that costs upwards of £10. Providing there's enough space to the side of the filter to move the tool by at least 90 degrees, then this can often be an effective means of undoing it. However, in some cases, there's not a great amount of grip, despite the tool looks quite substantial. Most comprise a metal band whose diameter is adjusted by means of a screw thread on the end of the tool. Unfortunately, the metal band doesn't provide much grip, only the area inside the end of the screw thread. Providing you can get a tight enough grip around the filter, then it can often successfully undo it, but otherwise it will merely slip. And if space is tight, you may find you have to unwind the tool after every turn to reposition it, tighten it and slacken the filter.

▼ Oil filter removal band from Halfords costs £15.50 and comes with a lifetime guarantee.

◀▶ Adjustable metal band oil filter wrenches from Laser Tools cost £10-£15 each. The smaller of the two (part number 2830) covers filter sizes from 65mm to 105mm, whereas the larger one (part number 3328) is for filters between 110mm and 155mm.

Self-adjusting metal band

▶ An adjustable metal band attached to a handle, which takes up the slack when attempting to undo an oil filter, meaning it can be quickly released to reposition it. The metal band can slip, especially if there's oil present, although some tools have a rubber coating on the inside of the band for improved grip. And the range of sizes this type of tool can cater for is, in some cases, quite limited, so you may need a couple of them, but most seem to cost around £10 each.



Ideal for tight spots, a self-adjusting metal band can make quick work of undoing an oil filter, providing there's no dirt and grease to cause it to slip.

▶ Cheap at £7.19 from Machine Mart (part number 040810721), this Clarke oil filter band wrench covers a small range of diameters from 73mm to 85mm, but that might be all you need.

◀ Laser's adjustable oil filter wrench has a steel band with an inner rubber coating and an adjustable mechanism to cater for filter diameters from 73mm to 105mm. Expect to pay around £14 (part number 3317).

Self-adjusting rubber band

At around £12-£15 for a pair of soft-grip strap wrenches from Draper (part number 43863), we found the larger of the two was useful for gripping a large oil filter. It's a bulky tool, so space around the filter is essential.

▶ In theory, a better alternative to a chain, fabric strap or a metal band is a rubber band because it should offer more grip. However, a rubber band is usually thicker and less flexible, so where an oil filter has restricted access, it may not be so effective.

Some rubber band removal tools are marketed for other purposes, such as undoing lids of jars and drainage connections. Others have a fixed diameter, so they are only useful for one specific size of spin-on oil filter.

Whilst there's no denying the fact that rubber offers a good level of grip when it comes to undoing a spin-on oil filter, it's worth noting that some metal band oil filter removal tools have a rubber coating for the part that grips the oil filter.

SEALEY
SEALEY

▲ Sealey's pair of oil filter removal tools each use a coiled length of rubber to wrap around a spin-on oil filter and undo it. Suitable for diameters up to 120mm and 150mm, expect to pay around £10 for the two (part number AK6408).

Three-legged

▶ A type of oil filter removal tool that sits on the end of a spin-on filter and has three self-adjusting legs to grip the filter to help undo it. Oblong-shaped legs help to grip the flutes on the edge of the oil filter, whereas round legs may have an abrasive surface to help grip whatever part of the oil filter they are holding.

Providing there's space at the back/end of the oil filter to fit a spanner or ratchet drive, then this type of oil filter removal tool is often very effective. It can also be used to fit a new oil filter and tighten it to the correct torque setting (providing you have a suitable torque wrench).

The only difficulty we've discovered with this tool concerns potentially crushing an old oil filter that has been overtightened, but at least it's capable of gripping and undoing them.

Three-legged oil filter removal tools can crush an old oil filter if it proves difficult to undo. On the plus side, they are good at maintaining a grip of the filter and will probably be the best tool for undoing one that has been overtightened.

◀ Silverline three-legged oil filter wrench from Screwfix costs a bargain £6.99 (part number 523FU) and requires a ⅜in ratchet drive to operate it to undo a spin-on oil filter. It caters for filter sizes from 60mm to 110mm.

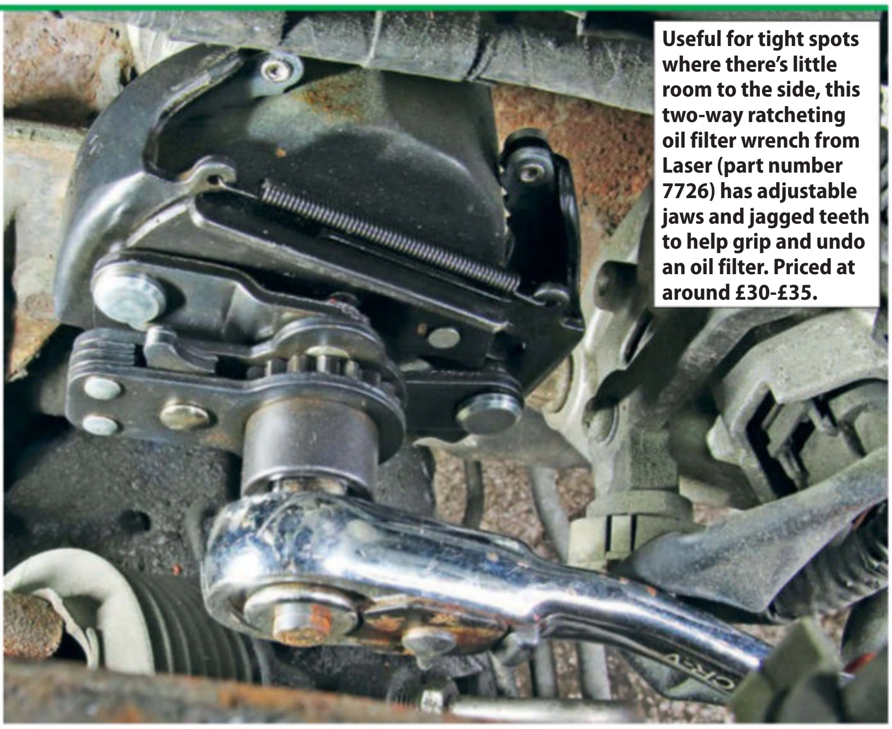
◀ Rough edges on the ends of each leg of this oil filter removal tool from Draper help to grip a spin-on oil filter. This one costs around £24 (part number 37871) and covers filter sizes from 75mm to 120mm.

▲ Three-legged oil filter wrench from Car Builder Solutions can be used with a ⅜in or ½in square drive or a suitable-sized spanner to undo a spin-on oil filter 60mm-110mm in diameter. Costs £7.80 (part number OFW).

Ratcheting wrench

▶ A combination of a claw- and cap-style of oil filter removal tool. Spring-loaded jaws ensure a range of spin-on oil filters can be undone (within a range of sizes) by fitting the tool onto the end of it. If a ratcheting mechanism is incorporated into the tool, then it can be used with any tool to turn it (spanner or extension bar with ½in or ⅜in adaptor), otherwise a ratchet drive can be used instead.

We feel this is a larger alternative to an end cap/cup, but more versatile because it can cover a range of sizes. We tested one from Laser (part number **7726**) and found the jagged teeth on the inside of the jaws provided a reasonable amount of grip around an oil filter. We liked the ratchet mechanism which can be switched to turn clockwise and anti-clockwise, and we also liked the simplicity of twisting the entire ratchet mechanism to open and close the jaws.



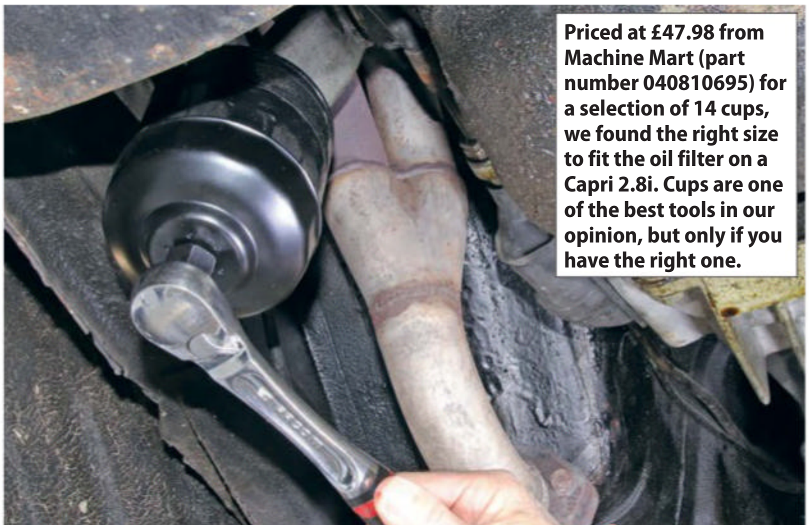
Useful for tight spots where there's little room to the side, this two-way ratcheting oil filter wrench from Laser (part number 7726) has adjustable jaws and jagged teeth to help grip and undo an oil filter. Priced at around £30-£35.

Caps/Cups

▶ Not as versatile as all the other oil filter removal tools we're looking at because caps or cups, as they are known, are a specific size, so you may decide to buy one specific size to cover your vehicle, or a range of them to hopefully cater for all eventualities. Budget for around £50 for a set, depending on how many you get in a box, or around £10 for an individual cap/cup.

Providing there's the space to fit a cap/cup onto the end of a spin-on oil filter, then this is a useful tool that is less likely to damage the filter if it has been overtightened. Most can be used with a ratchet drive (3/8in or ½in) and, in some cases, a spanner. Where a ratchet drive can be fitted, it also means the new oil filter can be correctly tightened to its recommended torque setting (if available).

These caps/cups are defined by their diameter, but also by the number of flutes. This refers to the number of flats on the outer edge of the oil filter, which are purposely there to help grip it.



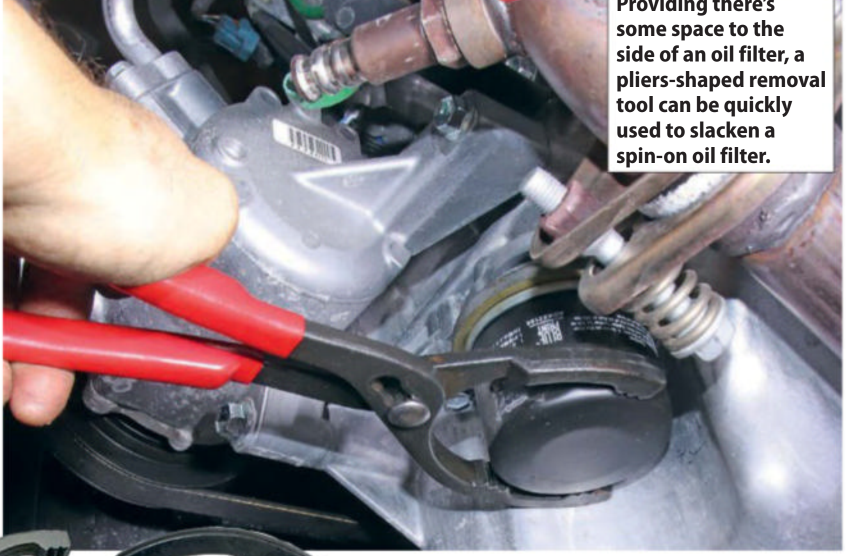
Priced at £47.98 from Machine Mart (part number 040810695) for a selection of 14 cups, we found the right size to fit the oil filter on a Capri 2.8i. Cups are one of the best tools in our opinion, but only if you have the right one.

▲ Box of 14 oil filter cups from Halfords costs £67 (part number 674150).

Pliers

▶ Not your typical pair of pliers, but ones with one or two jaws shaped to fit around a spin-on oil filter. Look for jaws with jagged inside edges for a good grip. Some of these cover a slightly less limited range of sizes because of the curvature of the jaws, but that may mean such a tool is more effective at undoing a spin-on oil filter when compared to one that covers a large range of diameters. Consequently, some manufacturers offer two of these tools – one for small sizes and another for large. Alternatively, look for a pair with adjustment – similar to water pump pliers.

We like these oil filter removal tools for their ease and speed of use, but they are only useful if there's enough space to the side of the oil filter.



Providing there's some space to the side of an oil filter, a pliers-shaped removal tool can be quickly used to slacken a spin-on oil filter.

▼ Adjustable oil filter pliers from Car Builder Solutions cost a reasonable £10.80 (part number OILGRIP).

◀ Oil filter pliers from Halfords cost £12.49, come with a two-year guarantee and cater for spin-on filters ranging from 54mm to 108mm in diameter.

⇨

Self-locking pliers

▶ The upmarket version of oil filter removal pliers. The benefit of locking pliers (also called vice or mole grips) has long been appreciated, so a dedicated pair with jaws suitably shaped to undo a spin-on oil filter seems like a sensible idea, and they can be easier to work with than the pliers we've outlined. However, they may also have the same limitations concerning space and the shape of the jaws (to fit a range of sizes of oil filter), although Sealey's angled oil filter locking pliers (part number **AK6423**) caters for sizes of 45mm to 130mm and costs around £22. And Draper's oil filter locking pliers (part number **61247**) covers 53mm to 118mm and costs a similar price to Sealey's. And there's a similar one from Laser Tools.

If an old oil filter has been overtightened, we can see these being potentially very useful.

Laser's self-locking pliers cater for spin-on oil filters ranging from 45mm to 130mm in diameter. Expect to pay £20-£24 (part number 7121).

We found this chain with self-locking pliers from Laser Tools a little fiddly to operate. The chain is fed through the tool to adjust its loop and wrap it around the filter, before locking the pliers and undoing the filter. For around £25 (part number 3794), we prefer Laser's other locking pliers (7121) for speed of use.

Overtightened oil filter: Rob's Mazda MX-5

▶ When Rob Hawkins bought his Mk2 MX-5 back in 2012, one of the first jobs he tackled was to change the engine oil. To his horror, he found the old spin-on oil filter was seemingly impossible to undo. With limited space to it from above the engine bay, at first he used a screw thread-style band to try to undo the old filter, but it refused to move and instead, the tool slipped. Next, he removed a nearby steady bracket to improve access and wrapped a chain tool around the old oil filter, attaching a ½in ratchet to it. The chain tightened its grip and started to crush the old oil filter, but eventually, it was loosened, and Rob breathed a sigh of relief.

Prices correct at the time of publishing

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Supplied with oil suction tubes in various sizes: 1 x 5mm Ø, 2 x 6mm Ø, and 2 x 8mm Ø, each 700mm long.

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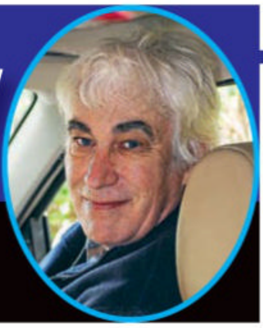
Dealer's Diary



Peter Simpson provides us with an insight into the automotive sales trading world – and beyond.

Big Motoring World

big
Motoring World.co.uk

▶ Many of you I'm sure saw the recent Watchdog report on Big Motoring World and their alleged reluctance to deal properly with a couple of customers who, on the face of it, seemed to have legitimate and serious issues. I don't know any more about the particular cases than was broadcast, though it was somewhat disturbing to hear that in one of the two cases, Big Motoring World had "waived storage fees for the car but closed the case." That, presumably, means they're not going to do anything more about it, and the only way that this customer is going to get satisfaction now is via the courts.

From the point of view of the wider trade however, I can see a lot more dealers getting requests for 30-day refunds following Matt Allwright's closing comments about consumer's rights being "'Very simple. If they find a fault or defect within the first 30 days, then you give them a refund within 14. You repay with no delay and no hurdles in the way."

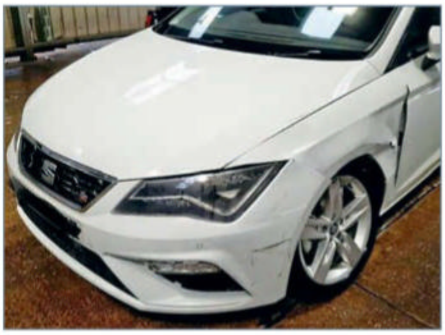
That is, of course, totally true. The problem, though, is that people often hear only what they want to, and in this case that's likely to be the words "refund" and "30 days", but not the bit about "fault or defect." The 30-day rule applies only if an actual fault is present, and that fault is sufficiently serious to affect the cars fitness for purpose. It does not apply in cases of "buyer's remorse" or where a buyer finds a really trivial fault and tries using that as an excuse when the real reason is that they've changed their mind…

Full refund after five years?

▶ January and February are usually pretty quiet periods in the trade these days; everyone spent up over Christmas, the big credit card bills from that are coming in, and new car buyers are waiting until the plate change on March 1. However, in my experience, times when money is tight also tend to encourage consumer try-ons, and motor traders are often the first port of call for anyone in need of extra cash.

After all, many people when dealing with the motor trade still regard them as inherently dishonest individuals, and as such consider them fair game.

Here's an example I heard of recently. Five years ago (yes, five years, not five months) a London-based dealer sold a one-year-old SEAT Leon with around 2500 miles on the clock. It was of course checked fully on HPI for damage/outstanding finance and so on and came up clear. In March 2025, customer tried to sell said car through Carwow, and it emerged that prior to the dealer buying it, it had been sold via a salvage auction. All cars sold via this way are recorded automatically on VCAR even if, as in this case the damage isn't sufficient for a write-off. There was some relatively minor damage to the nearside front wing. As you can see, it really wasn't that serious at all!



A sale this way can happen for several reasons, but the most common when a car is nearly-new is that it was being used as a demonstrator/management car or similar, and for the dealership concerned it was more cost-effective to sell it as is than put it through their workshops to be repaired. Late cars with minor damage also tend to make strong money as salvage, and it's not unknown for the drop in value caused by the damage to be less than the cost of a main dealer repair.

The next bit, however, was the try-on. Despite owning the car for five years, and driving it for 30,000 miles, the customer thought, based on "advice" that he was entitled to a full refund "under mis-sale of goods" of the full price that he had paid in 2020. Er no…

I'm not sure how this was resolved, though I believe the dealer in question did offer a refund minus the industry-standard 35p a mile for use by the owner. 30,000 miles at 35p comes to £10,500.

The only issue here might be if the dealer had sold the car as never having had any damage – no-one should ever do that unless they've known the car from new so know for certain that it's true.

Unreasonable expectations?

▶ A couple of years ago, a dealer sold a 2009 Toyota Yaris – fourteen-years-old at the time of purchase. A couple of weeks later the car was returned for a couple of minor issues to be resolved. The dealer then heard nothing more until the following missive arrived 18 months later...

"I am writing to share my experience regarding the purchase of my 2009 Toyota Yaris from your dealership in August 2023. While I appreciate the service provided, there are a few concerns I'd like to highlight that have left me feeling frustrated, especially given the expectations I had for a dealership that prides itself on excellent customer service.

Initial condition of the car: When I took possession of the car, I noticed that the rubber trim (or bumper moulding) was loose, and this was clearly visible upon receiving the keys. Additionally, the wing mirrors were not functioning. While I'm grateful that these issues were addressed and fixed a couple of weeks later, they were not in an acceptable condition at the time of sale.

Key battery: The keys provided to me had a low battery, and I had to replace the batteries shortly after purchasing the car. While this isn't a major issue, I would expect a dealership to ensure that even small details like this are checked prior to handing over the keys, especially considering your emphasis on customer service.

Fuel issue: When I purchased the car, it had only two bars of fuel. Given that there's a petrol station directly across the road, I would have expected the car to have a full tank. This also led to a more significant issue: In order to fill the car, I have to hold the nozzle at an awkward angle to get the fuel to enter. I didn't initially raise this concern, as I assumed it was a minor quirk. However, after taking the car to the Toyota garage today, they informed me that the issue can only be resolved by replacing the entire fuel system, which could cost £600-£800. They believe this issue is due to the previous owner pushing the nozzle too far into the system. Had the car been filled up fully before sale, this fault would have been identified.

Popping/grinding noise: Since purchasing the car, I've experienced a popping/grinding noise, particularly in wet weather or when driving over grit, originating from the rear driver's side. You kindly looked at the car free-of-charge around April 2024, but no fault was found at the time. However, I initially took the car to the Toyota garage (a few months before I took it to you) and they identified a badly corroded heat shield, which they replaced. While this part was responsible for some of the movement, it didn't fully resolve the noise. I understand that it would have been difficult for you to identify this issue without regularly driving the car, so I don't place much blame on you for this. However, I do feel the heat shield's condition should have been apparent before selling the car.

Intermittent grinding noise on starting: There's also an intermittent grinding noise that occurs when starting the engine from cold – about once in every 50 starts. This has been present since I purchased the car. Although Toyota has checked the relevant components and found nothing faulty, this issue remains unresolved. Again, I don't expect you to have identified this without regular use, and I believe this was another hidden issue that the previous owner did not disclose.

In conclusion, while some of these issues seem to be the result of oversights from the previous owner, I feel that there are several areas where greater attention could have been paid during the sale process. These issues have left me frustrated, and with me thinking of selling the car in the near future, I will have to declare these faults, which may affect its resale value. I hope that this feedback helps to highlight areas where your dealership can make small improvements to enhance the overall customer experience.

It has certainly influenced my view of buying second-hand cars in the future, and I'll be sure to consider these factors moving forward.

Thank you for taking the time to read my email, and I trust you will find it helpful."

Hmm... it's probably a good job that this customer didn't experience a real problem, isn't it?

Closures and consolidations

▶ Times in the motor trade certainly seem to be changing at present. On 14th February British Car Auctions have announced closure of their Chipping Norton remarketing centre with the loss of up to 200 jobs and work being transferred to Bedford and Northamptonshire. A spokesman said: "Like all businesses, BCA needs to evolve its operational base in line with its growth journey and the changing external environment and needs of our customers to ensure we continue to provide market leading service and support."

Then, on 25th February Marshalls Motor Group (which, like BCA, is owned by Constellstion Automotive) announced closure of their VW dealerships in Aylesbury and Horsham which, apparently, had been running at a loss for several years. Next, on 3rd March, Group 1 Automotive announced close of three of their VW dealerships in Cheltenham and on The Wirral, and their Audi outlet in Hyde.

And finally, as this issue went to press, we heard that Mylchreests, a name that will be familiar to anyone who has visited the Isle of Man since the 1960s, are closing their sales and service operations on 16th April. Family owned and run, and part of the Manx scene since 1961, Mylcheeests were for many years the island's BMC/BL dealership and also held a Rolls-Royce/Bentley franchise. More recently, they've represented Land Rover, Subaru, Vauxhall and Isuzu. According to current Managing Director, James Mylchreest: "The retail motor industry has changed hugely over the past decade, during which time we have witnessed the closure or streamlining of a number of smaller independent garages throughout the Island and the UK. This is a trend that we anticipate will continue for some time and one which makes a small, franchised operation such as ours increasingly challenging."

Ian Cushway searches out **new** and **used** parts prices

Ford Mustang

Realise your muscle car aspirations with this value-packed, nearly-new Mustang GT SS50.

The sixth generation S550 arrived here in 2015 and was the first Mustang to have its steering wheel on the right-hand side. And it was about time, considering its drop-dead gorgeous looks were down to British designer, Moray Callum – the younger brother of Jaguar stylist Ian Callum.

It was available as a Fastback coupe or Convertible and while a four-cylinder 2.3-litre EcoBoost Ford unit appeared in the line-up, most buyers chose the 5.0-litre V8 as the engine to fulfill their Mustang-owning aspirations. That said, producing a claimed 310bhp (although this dropped to 285bhp after 2018), the smaller engine was far from lame. Indeed, it was only fractionally slower than the V8, obviously far more frugal, and being 80kg lighter up front, it handled better, too.

For those still sitting on the fence regarding what model to buy, the deciding factor was price – the V8 was a mere £4500 dearer than the 2.3. This helps explains why only a handful of people decided they could live with having fewer cylinders and why the 2.3 model disappeared from the sales catalogues at the end of 2020.

The Mustang received a facelift in 2018 with the introduction of the phase two models when the suspension was tweaked and engine capacity increased to 5038cc. This was quite a significant milestone because with it came a boost in power from 410bhp to 450bhp and the availability of Performance Packs which further enhanced the car's abilities. The PP1 came with 19in alloys, Brembo brakes and the option of MagneRide suspension, while the PP2 was purely for the track with wider wheels, MagneRide as standard and more radical traction control settings.

Oh, and cars after this date also had more safety gear installed to boost the car's Euro NCAP crash test performance from a rather abysmal two to a still somewhat marginal three star rating.

Then there was the 480bhp Bullitt which came along later in 2018. Like the original 1968 model in the movie – it was painted dark Highland Green. It's thought that just 350 were produced for the UK market.

The model was replaced by the seventh generation Mustang in 2023 which immediately put pressure on its predecessor's residuals – something not lost on UK buyers who can now take advantage of some truly affordable deals in the classifieds.

The parts prices quoted here are for a post-2018 5.0.

What model?

▶ We've already established that if you're after the authentic Mustang experience, you'll need the V8. That said, the 2.3 turbo works very well and would be a better bet for regular use.

Standard kit in the Mustang included a host of goodies, including LED headlights, 18in alloys, adaptive cruise control, dual zone climate control, an 8in touchscreen and even a reversing camera so you won't be disappointed.

Post-2018 facelift cars not only had more power but a better suspension and superior quality trim, so they'll feel more refined.

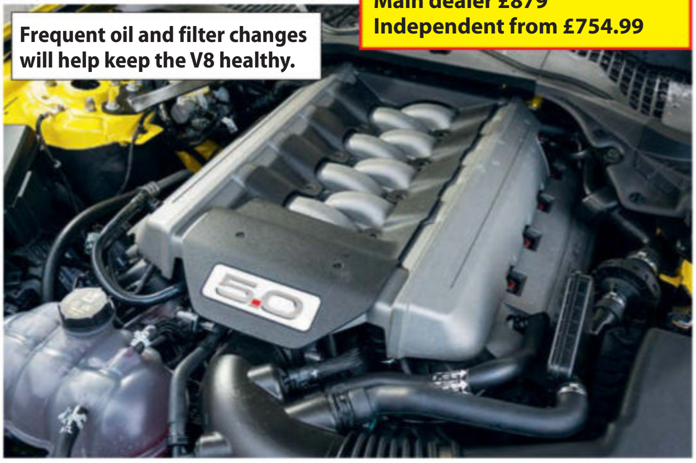
Engine component prices

OIL FILTER
Main dealer £18.91
Independent from £9.49

WATER PUMP
Main dealer £118.82
Independent from £324.17 (performance)

CLUTCH KIT
Main dealer £879
Independent from £754.99

Four-cylinder 2.3 EcoBoost is quick and cheaper to run – but doesn't really live up to the Mustang dream.



Frequent oil and filter changes will help keep the V8 healthy.

Engines

The Coyote V8 with its port injection and chain-driven variable cam timing has a good track record when it comes to reliability, although the phase two lump has gained a reputation for piston slap at idle from cold which could result in scoring of the cylinders. A rattle and eventual loss of compression are likely to be the tell-tale signs, but we suspect it's quite rare. Oil leaks have been noted, too, particularly from the oil coolers as has loss of coolant, with the resultant overheating likely to cause all manner of expensive problems if overlooked.

Oil and filter changes should be carried out every 5000-10,000 miles depending on how the car's been driven.

There were a couple of recalls relating to battery

Post-2018 facelift V8 grew in capacity but wasn't any quicker on paper.

Steering/suspension component prices

MAGNERIDE FRONT DAMPER
Main dealer £835.20

DRAPER Tools
LUCAS OIL
www.LucasOil.co.uk
DRAPER Tools
AF18 AGU

Brake component prices

FRONT BRAKE DISCS (PAIR)
Main dealer £395.18
Independent from £255.99 (EBC)

FRONT BRAKE PADS
Main dealer £559.18
Independent from £148.99 (EBC)

Ford produced just 350 of the Bullitt model in one colour – Highland Green.

cables running too close to the exhaust manifold and one concerning the driver's airbag, so check these have been attended to.

The Mustang came with a six-speed manual as standard, although there was the option of a six-speed auto on cars up to 2018, and a 10-speed auto on the phase two facelift. Both were equally popular. Possibly as a result of a faulty valve body or CDF drum, some owners have encountered harsh/lazy changes and hunting for gear niggles on the 10R80 10-speed auto – all of which will be horribly expensive to diagnose and fix, so pay close attention to its shifting on a test drive. A limited slip differential came as standard, as did Line Lock which would apply the front brakes to facilitate burn outs. Great for car park shenanigans but not something you'd realistically use on a daily basis.

Suspension/steering

The multi-link setup at the rear was a big step on from the previous Mustang's live rear axle, but it can still struggle over poor road surfaces and there's body roll in corners. Post-2018 facelift cars got the option of adaptive MagneRide damping featuring a unique fluid inside the damper that can be electronically stimulated to offer higher or lower damping resistance, and this may suit those in search of a more comfortable ride although many complain that it is still too wallowy.

The steering will undeniably feel heavy compared to a modern hatch, but arguably that's all part of the car's charm!

What to pay

▶ New, the V8 Mustang was good value new in 2015 at under £40,000. It offers even more bang for your buck now. When we looked online, we found a 2016 V8 with just 38k miles on the clock being sold privately for **£20,060** – and that was for a convertible! A different private seller was offering a 2017 Fastback with 68,000 miles under its belt for **£22,500**. With a budget of between **£28,000-£30,000** you will be able to purchase a post-2018 facelift car with very few miles on the clock.

There's actually a reasonable amount of room in the rear – at least compared to rivals like the Porsche 911.

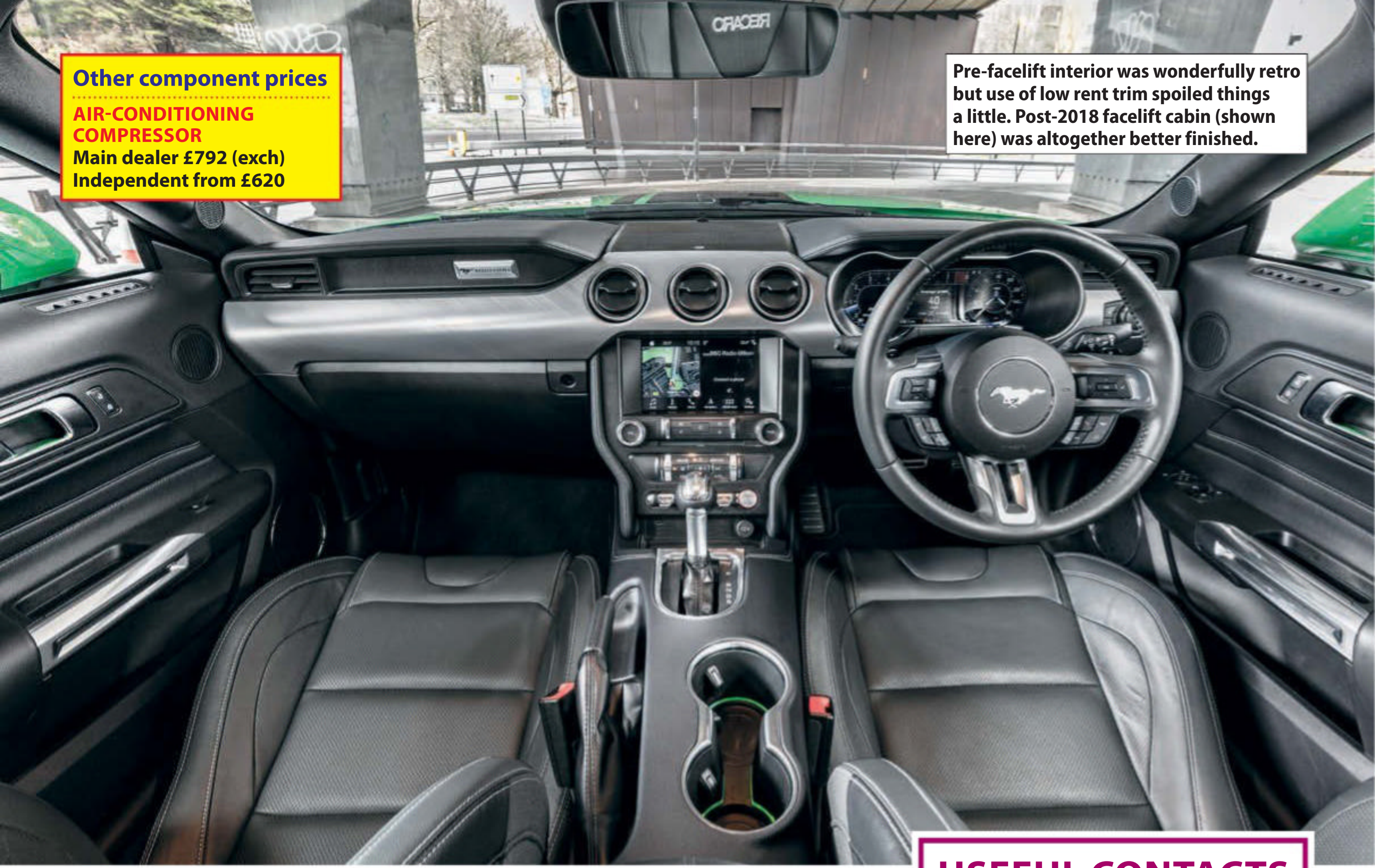
Running costs

▶ When it comes to VED, most GTs will be £600 (depending on when it was registered), with the EcoBoost likely to less (from £190) – again, depending on when it was first registered. Thanks to its efficient turbo, fuel economy from the 2.3 is reasonably good at 35mpg, at least compared to the V8 which will struggle to achieve much more than 20mpg.

Insurance is group 41 for the humble 2.3 and 43 for the V8.

When it comes to parts, none of the big nationwide independents stock items for the GT – so your local Ford main dealer will be a good place to shop, although there are a few UK based specialists that might be able to help.

Boot can usefully hold 332-litres of luggage.



Other component prices

AIR-CONDITIONING COMPRESSOR
Main dealer £792 (exch)
Independent from £620

Pre-facelift interior was wonderfully retro but use of low rent trim spoiled things a little. Post-2018 facelift cabin (shown here) was altogether better finished.

0890
RPM
mph
0

Post-2018 dash featured gimmicky digital dash.

Brakes

There are no brake issues to report, so it's just a case of checking the state of the discs and pads and replacing worn items. Needless to say, given the V8's performance, brake components aren't cheap. However, if you are prepared to shop around at one of the Mustang independents, you can shave a little bit of the cost of replacement items.

Other issues

The Mustang was assembled at Ford's Flat Rock plant in Michigan and there's been a few complaints about build quality. In short, therefore, don't necessarily expect all the panel gaps to be the same – even on a brand-new car. The paint finishes weren't always good, either.

Hoods should operate smoothly, but they're a bit of a faff to begin with; you have to manually release the canvas by twisting a large latch before the electric motor takes over.

When inspecting cars, check the aircon works – the compressors are fragile. Indeed, that goes for a lot of the electrics – by this we mean random faults with the central locking, dash and window regulators.

Ford Mustang 2015-2024

MODEL	2.3	5.0 (pre-2018)	5.0 (post-2018)
Engine (cc)	2263	4951	5038
Power (bhp)	310	410	450
0-60mph (secs)	5.6	4.6	4.7
Top speed (mph)	145	155	155
Average fuel (mpg)	35	20	23.9

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autoairconparts.co.uk
Bilstein bilstein.com/en
Gates of Stevenage 01438 500873
gates.co.uk
Nemesis UK nemesisuk.com
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Verdict

▶ If you've always dreamed of owning an old-fashioned muscle car, this could be the perfect opportunity because the Mustang GT is reliable, great value and you won't need to sit on the wrong side of the road when you drive it.

OK, so build may not be up to Audi standards – and pre-facelift cars have a lot of cheap plastics inside which spoils things. And that digital instrument binnacle which changes depending on the performance settings is a little gimmicky. But given the sheer enormity of its character, these are things what the majority of buyers will happily live with. Moreover, it's a four-seater so you can fit the family in the back, too, as well as their luggage in the 332-litre boot out back.

We can see the logic in buying a 2.3 but we'd always feel a little short-changed – and that V8 with its villainous exhaust note is, well, just epic!

PORSCHE CAYMAN S

FRONT SUSPENSION REVIVE

Peter Rosenthal replaces the tired front dampers and suspension arms on a 2010 Porsche Cayman S. The procedure is similar for most models of Porsche from 1996 onwards.

Equipment required

- 10mm, 13mm, 16mm, 17mm and 19mm sockets and ½in ratchet driver
- 18mm impact socket
- 21mm through socket
- T20, T30, T40 and T55 Torx sockets (or screwdrivers for the smaller fixings)
- ½in extension bars
- 10mm, 17mm, 18mm, 19mm, 21mm and 22mm spanners (fixed and ratchet ideally)
- Thin 17mm open-ended spanner (or grind down an old one)
- 6mm Allen key
- Water pump pliers
- Impact wrench
- Blow torch (for seized fixings)
- Selection of large molegrips
- Drill and wire wheel
- Air hammer
- Tape to protect wheelarches
- Angle grinder with thin cutting disc and safety goggles
- Trolley jack
- Torque wrench
- Old screwdriver for prying
- Axle stands and wheel chocks
- Selection of hammers
- Cable ties in assorted sizes

Porsches can make great secondhand buys and with prices starting from under £5000 for a useable 986 Boxster. They offer a lot of performance for the money. A recurring theme with them, though, will be tired suspension, but it's relatively straightforward to do a refresh. The 986 and 987 generation of Boxsters and Caymans have a very similar design of suspension, so this fitment is equally applicable to most models (and many 911s). This particular car had a failed front strut that was giving a bouncy unstable ride.

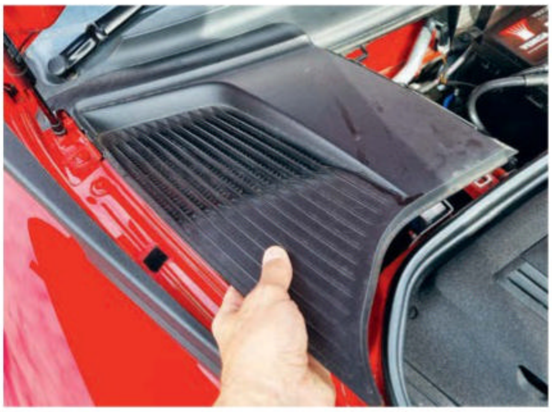
While most of this fitment is similar to replacing a MacPherson strut on many other brands of car, the only thing to be wary of is galvanic corrosion between the aluminium hub and the steel strut body which makes removing the anti-roll bar droplink pin a challenge. All models of Porsche tend to suffer from this and YouTube videos of people simply tapping the bolt out with a hammer should be taken with a pinch of salt. All four were seized on this 2010 car!

These stubborn droplink bolts means it is wise to have a few specialist tools to hand – specifically an impact wrench, air hammer (run off a compressor), angle grinder and a blow torch. Hopefully you won't need to use them, but it's wise to have them to hand. Unless you're replacing the springs, all the dust bellows, bump stops, top mounts, spacers and rubbers, you'll also need a spring compressor.

If everything unbolts easily, it takes around a day to swap out the front struts. If you're also doing the rears – which are similar – it will take at least another day as more trim needs to be removed at the rear (especially on a Cayman).

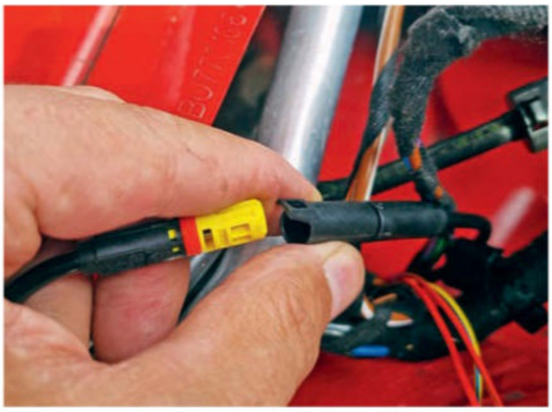
Rather than replace the stock suspension with OE items, we chose to upgrade it to Bilstein B8 dampers mated up to stock Porsche Cayman R springs and fitted these to all corners as well as replacing all the wishbone arms and top mounts. All parts were supplied by either Design 911 or Porsche themselves (who proved cheapest for all the fixings). Stock Bilstein B4 dampers cost from £341 a pair (or £683 for four), while the B8s are £273 each corner. This particular car had the option PASM system (Porsche's electronically adjustable dampers) so these were dearer at £740.88 for the fronts and £680 for the rears. The Cayman R springs were genuine Porsche items and cost £400, while the Meyle lower coffin arms were £250 the pair from AutoDoc in Germany. The new track control arms, top mounts and various replacement nuts and bolts added another few hundred pounds to the job. The vehicle had to be professionally aligned after carrying out this job, too – this cost £180 at a local Porsche specialist Zentrum.

So, it wasn't a cheap exercise, but it did utterly transform the car. It's also worth noting that the OE dampers were original – a 14-year lifespan isn't bad and does hint at the value of original parts.

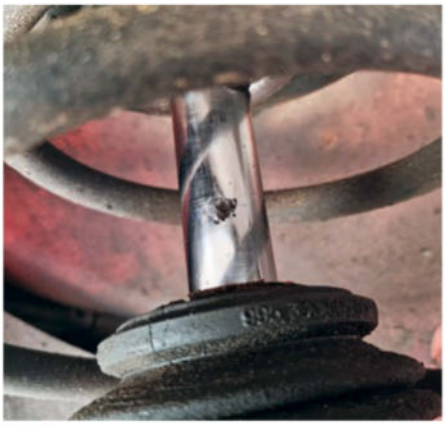


1 ◀ **Start under the front bonnet by removing the plastic trim covering the strut tops. This just unclips out of the way once the central battery cover has been removed. Store all these panels out of the way in the front boot section.**

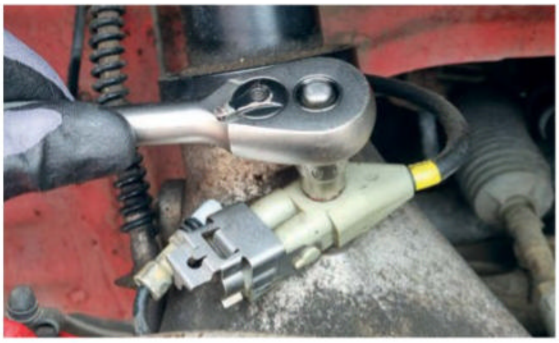
2 ▶ **If the car is fitted with the electronically-adjusted PASM (also known as Bilstein Damptronic) then locate the plugs in the scuttle tray and unplug them.**



3 **Lift the car up on two jacks and support on axle stands before removing the road wheels. It's helpful to have two jacks so you can support the strut when it's ready to be lowered free.**

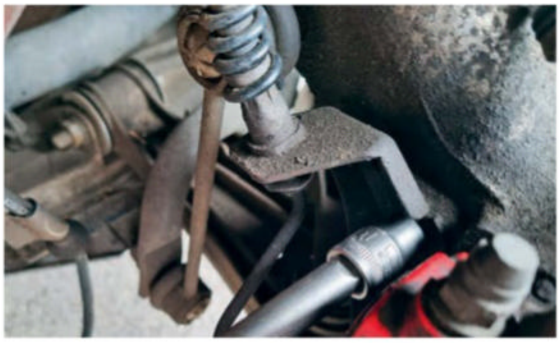


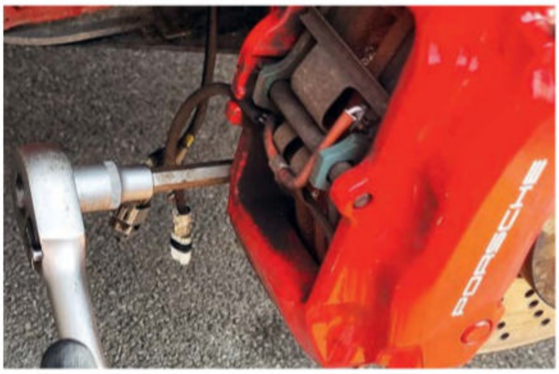
4 **You can see on the defective suspension damper that the dust cover has perished, and the damper rod has been damaged. There was also a light misting of oil around the seal.**



5 ◀ **Start by unplugging the ABS sensor wire and brake pad wear indicator plug from the main car's loom and then remove the 10mm screw securing it to the steering knuckle.**

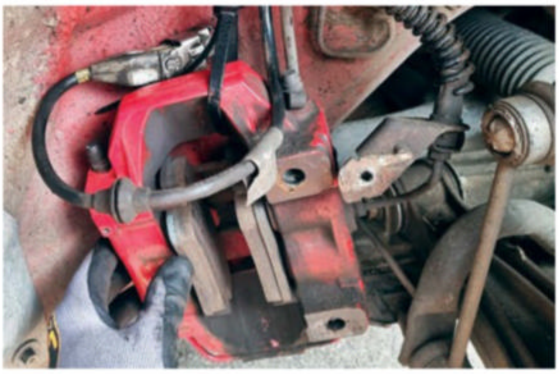
6 ▶ **The brake caliper and disc needs to be removed next, starting by removing the 10mm screw holding the brake pipe to the steering knuckle.**

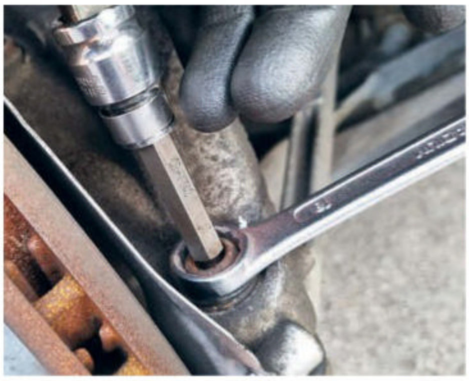




7 ◀ **Using a T55 Torx screw in a half-inch ratchet socket, undo the brake caliper bolts. It's wise to replace these bolts on the refit.**

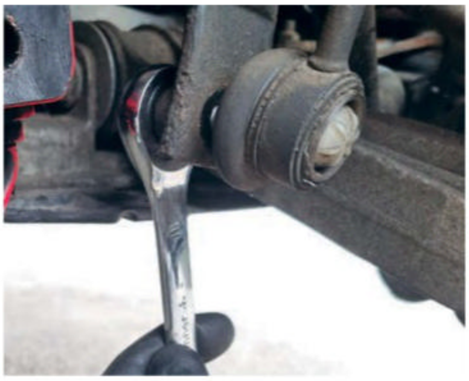
8 ▶ **Remove the brake caliper and cable tie it out of the way – this brake bracket on the inner wheelarch was ideal to keep it out of the way. Try to avoid straining the flexible brake hose.**

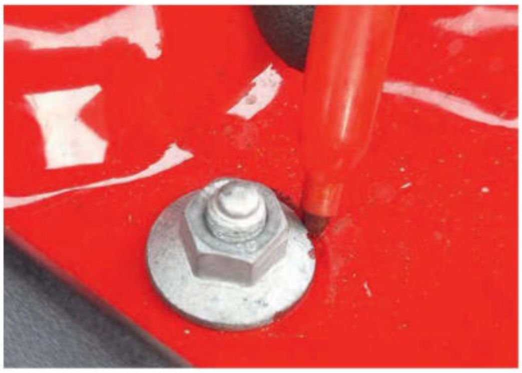




9 ◀ Using a T40 socket and an 18mm open-ended spanner, remove the nut securing the steering rack tie rod to the steering knuckle. It can be quite stiff so you may need to use a longer spanner. Sometimes a balljoint splitter is needed to remove the joint, but in this case, once the nut was partially undone, a swift tap with a soft-face hammer released it.

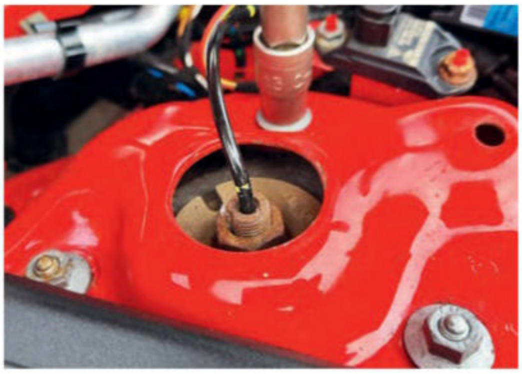
10 ▶ Remove the 16mm nut securing the anti-roll bar to the droplink. The droplinks nearly always seize in the steering knuckle, so it's wise to buy replacements. Don't waste any time if the nut is seized – simply chop it off with an angle grinder.

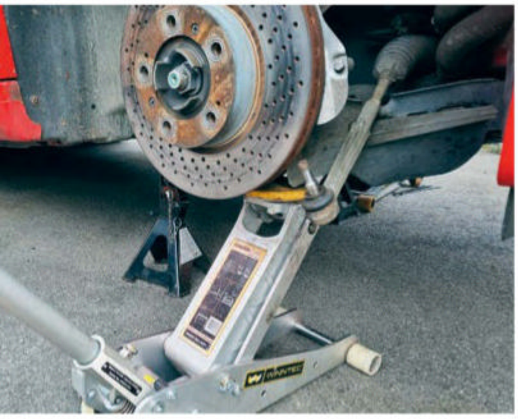




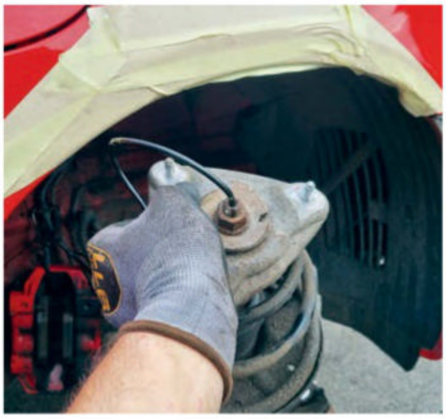
11 ◀ At the top of the suspension struts, mark the position of the 13mm nuts. The studs holding the top mount are in slightly oversized holes so there is a small amount of movement which can affect the camber. This is why an alignment is essential afterwards.

12 ▶ Loosen the three 13mm nuts with a socket and ratchet driver but don't fully remove them. They want to be finger tight so you can easily spin them off by hand.

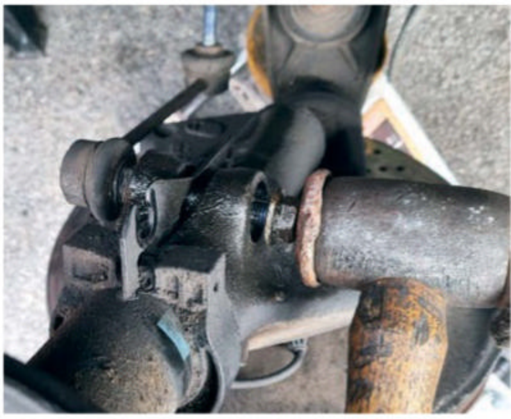




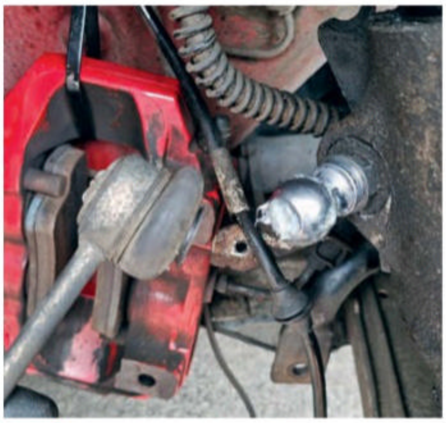
13 Line the wheelarch with tape to protect the edge from chips and with a jack on the underside of the 'coffin arm' wishbone, support the strut. Remove all three 13mm nuts at the top of the strut and get ready to carefully lower the jack.



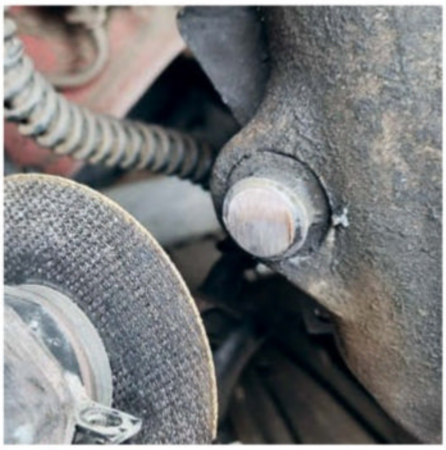
14 Support the strut with one hand and carefully lower the jack. Make sure the strut doesn't flop forward and smash into the wheelarch edge. Once the jack is fully down, push down on the strut and release the top edge from the car.



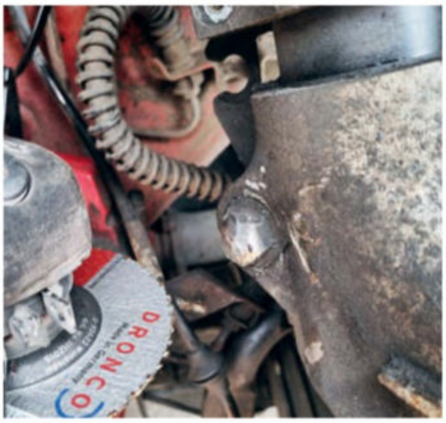
15 Spray penetrating oil on the droplink/strut bolt and unscrew the 18mm nut on the end (there is a 17mm thin spanner hold on the droplink side). Try hitting the end out with a soft-faced hammer. It will probably be seized, though.



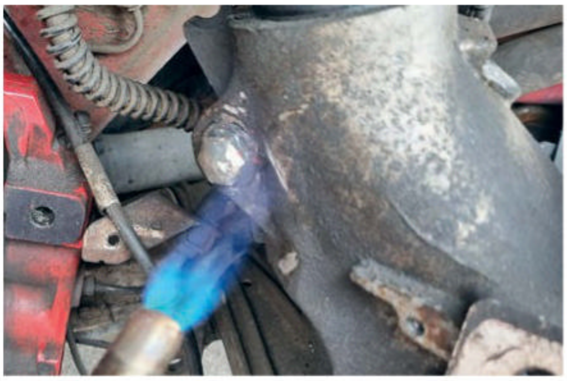
16 If the bolt is seized, you'll need to do some work at the balljoint end of the fixing. Start by wrenching off the lower droplink arm – it can be pulled off by angling it through 90°.



17 With an angle grinder fitted with a cutting disc (and suitable eye protection), chop the ball end off the end of the fixing.

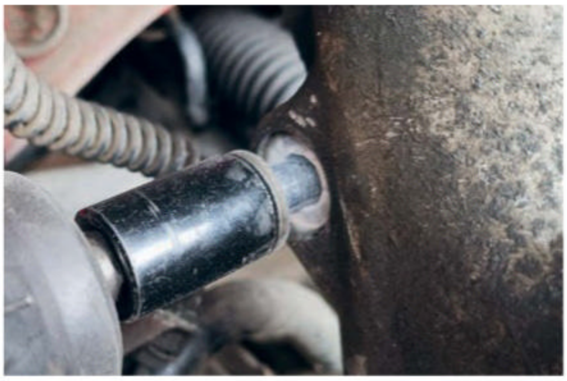


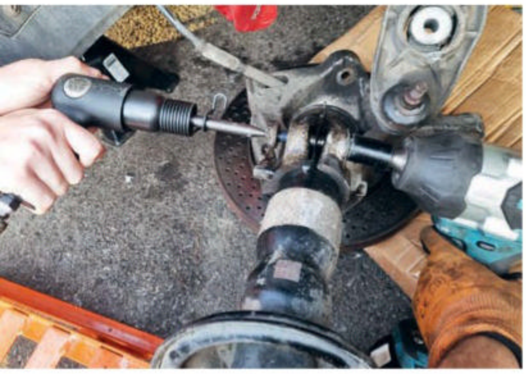
18 Swap to a grinding disc and get rid of the excess metal on the fixing so you're just left with the Hex end. This allows you to get a 17mm socket on the end of this fixing in an impact gun.



19 ◀ Try rotating the fixing with an impact gun and a 17mm socket. If you're lucky it will move. If it doesn't apply heat to the bolt area using a blow torch.

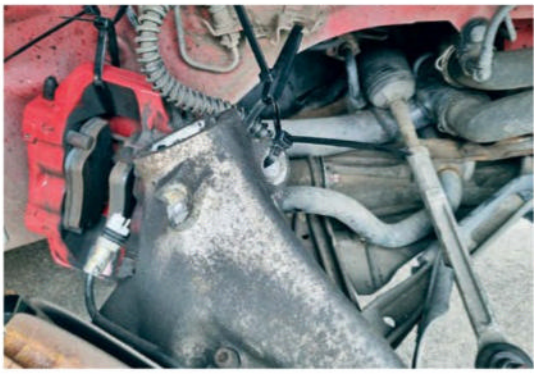
20 ▶ Try again with an impact gun – once it starts to move, you're on the home straight.

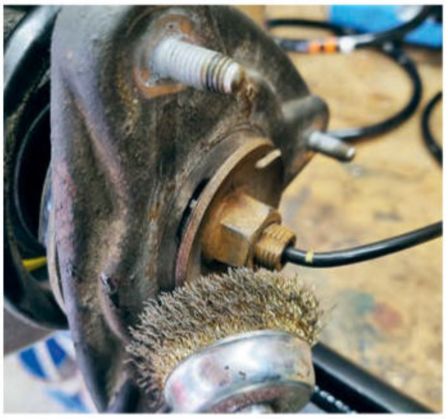




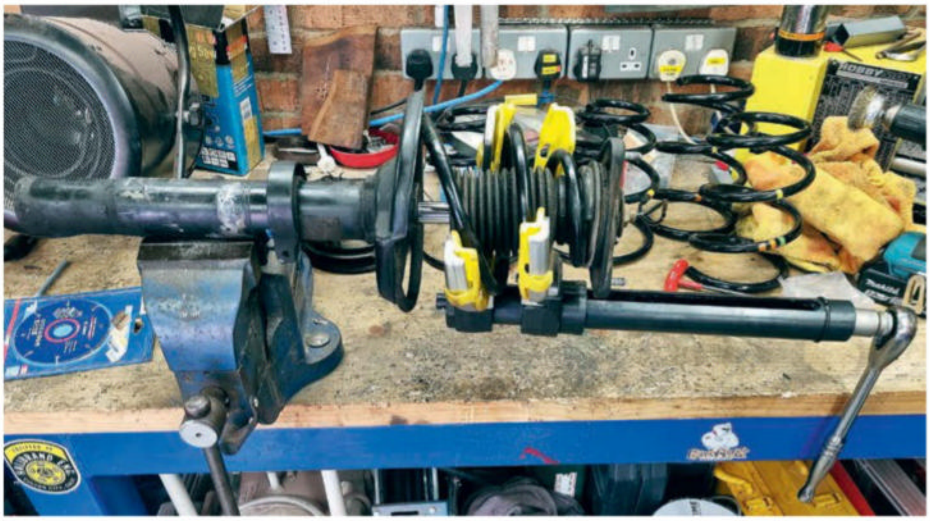
21 ◀ If the fixing is still stubborn to shift, you might need to remove the lower balljoint (it uses an 18mm nut and you'll need pickle fork to free it) and then having an assistant hammer on one end of the fixing with an air hammer while you spin the fixing with an impact gun. This method is tedious but will always work!

22 ▶ Once the bolt has been extracted, remove the strut from the suspension knuckle and use some cable ties to secure this to a bracket on the inner wheelarch. This is also a good time to remove the lower wishbone arms (we had to do it later as the part hadn't arrived, but it proved a simple bolt-off, bolt-on job).

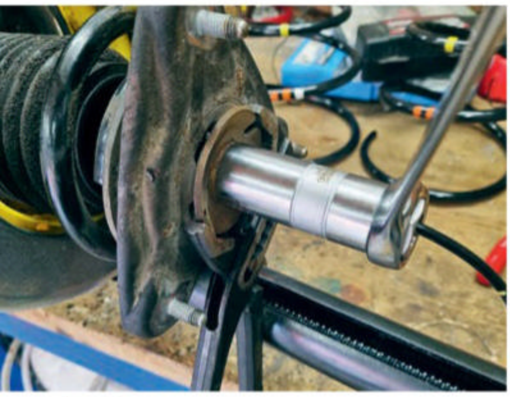




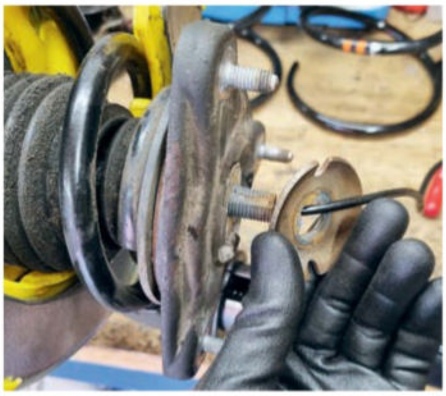
23 Clamp the whole strut assembly in a vice and use a wire brush head in a grinder or drill to clean off any corrosion on the strut threads. We reused some of the old components – but it is probably easier to skip this step and replace all the old damper parts.



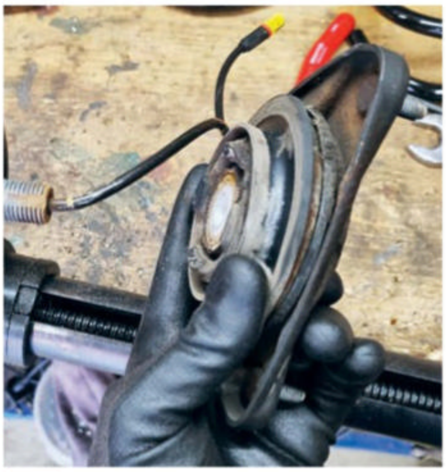
24 Using a spring compressor, tighten up the coil spring to remove the tension on it. This is extremely important with stock springs as they hold an enormous amount of energy.



25 Once the coil spring is loose enough to be moved by hand and isn't putting any pressure on the top mount, remove the top mount nut with a 21mm through socket and a spanner. Water pump pliers stopped the top plate rotating.

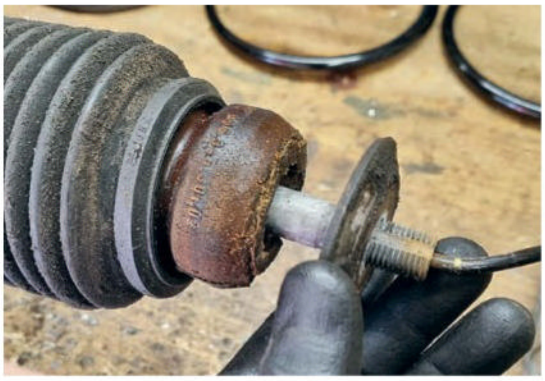


26 Remove the top plate – it's fiddlier on these particular dampers as the PASM wiring exits through the centre of them. On most dampers, the damper shaft has either a Hex or Torx centre to prevent it rotating while unscrewing the nut.



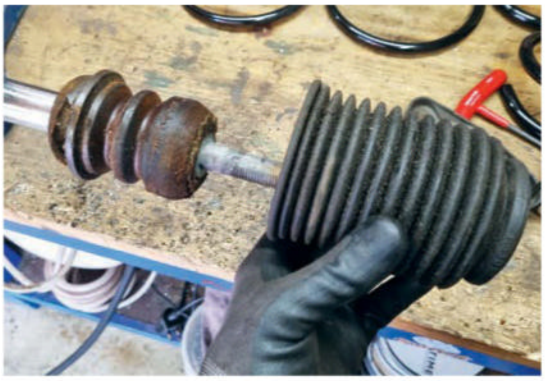
27 Then remove the top mount, together with its rubber spring support and metal plate.

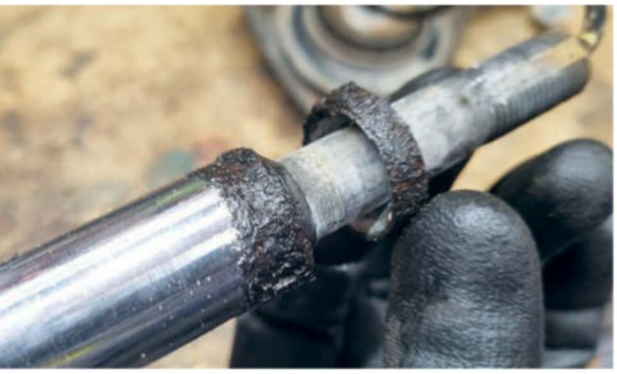
⇨



28 ◀ Extract the spring and spring compressor out of the way (this can now be unscrewed and removed from the old spring) and remove the lower damper plate.

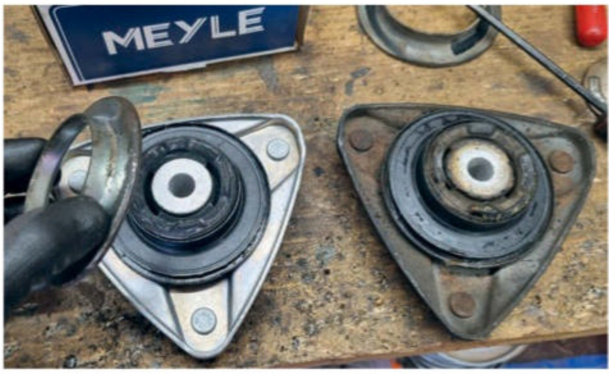
29 ▶ The old dust boot and bump stop can now be removed from the strut. It's not worth reusing these items as they have perished, but the new dampers come with new dust boots and internal bump stops so they're not needed.

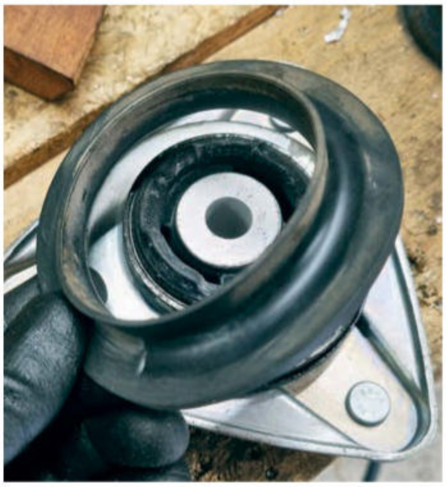




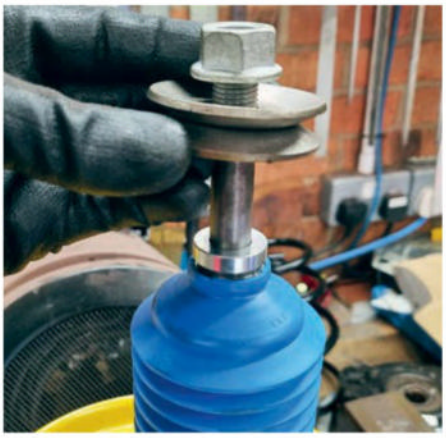
30 ◀ You can see just how bad the original dampers were – the top bush on them had corroded away extensively and the chrome plating at the top of the shaft had started to corrode. This damper could be pushed in far too easily and had very little resistance.

31 ▶ On the new Meyle top mounts, the only items to be reused were the top metal support plate...

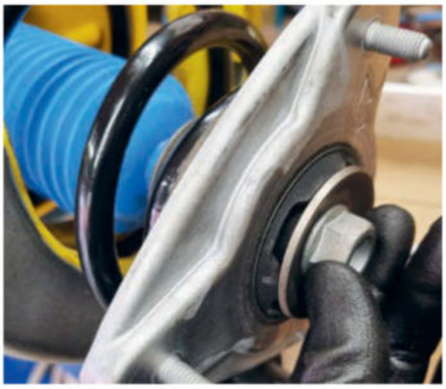




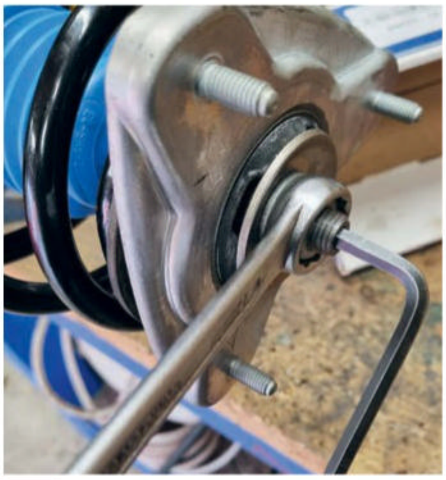
32 ...and this rubber spring support pad. This isolates the spring from metal-to-metal contact to try and keep the noise down.



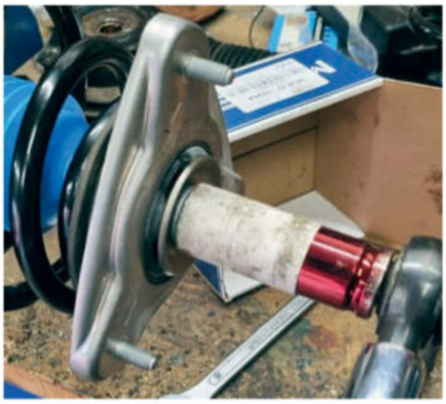
33 The new Bilstein B8 dampers come complete with internal bump stops (they differ from the originals as the dampers run in an inverted position), new dust covers, bushes and upper and lower top mount plates.



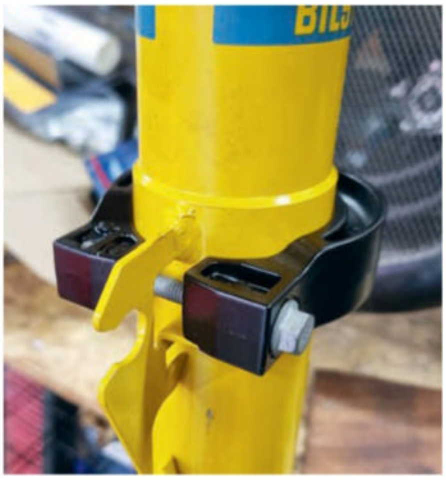
34 Compress the new spring in the spring compressor. OE dampers are B4s. B6 and B8 dampers are upgraded dampers – B6 is for stock OE springs and B8 for lowering springs. Refit the new top mount taking care to ensure the spring is seated correctly. Refit the Bilstein damper nut.



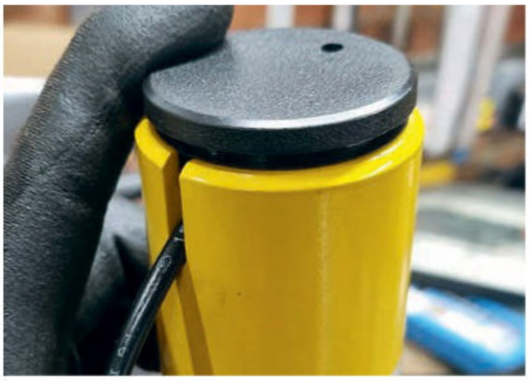
35 Using a 6mm Allen key to prevent the damper shaft rotating, tighten down the 21mm nut until it is fully seated home.



36 With a torque wrench, tighten the top nut to 110Nm (83lb ft). You can now release the tension on the spring compressor, taking care to ensure that the new spring is sitting correctly on the top mount and the dampers lower spring plate.

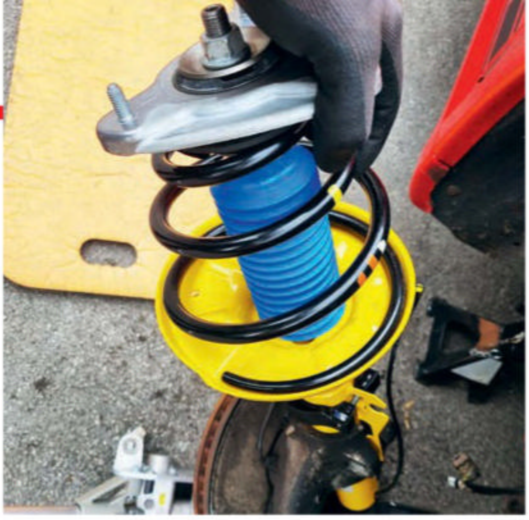


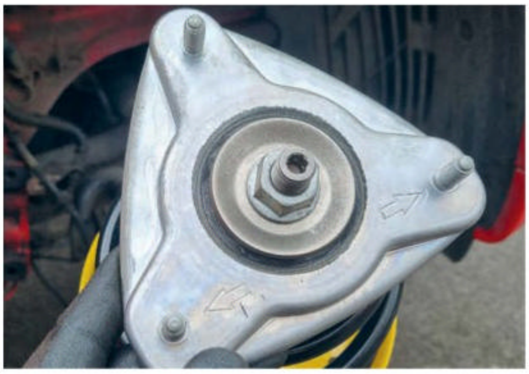
37 Refit the lower damper clamp (we used new ones with new bolts from Porsche), but you can reuse the old ones.



38 ◀ On the Bilstein B8 dampers the PASM wiring comes out of their base (because the dampers are inverted) so the wiring run is slightly different. Bilstein supply these plastic caps to prevent debris getting to the wiring – these simply tap into place.

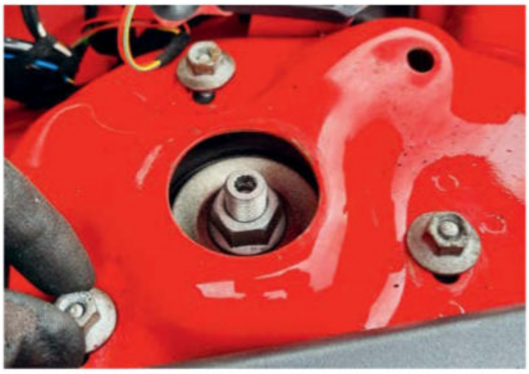
39 ▶ With the new unit fully assembled (and the spring seated neatly in the lower spring cup as shown) it can be refitted to the steering knuckle on the car.

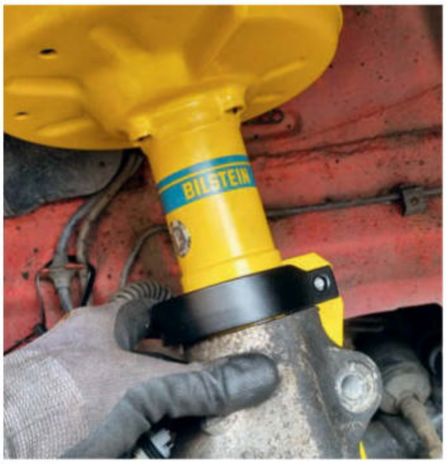




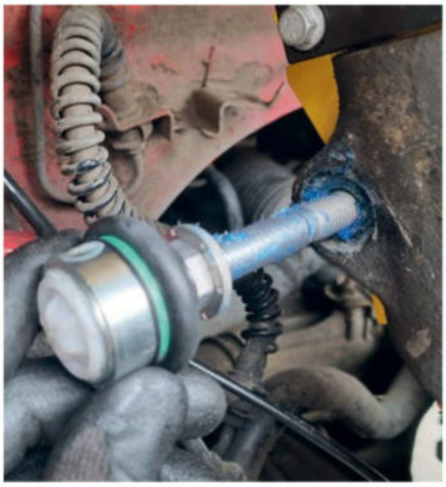
40 ◀ These two arrows should face towards the outer edge of the car – as the top mount is fitted to a bearing it can be rotated.

41 ▶ Push the strut under the wheelarch and using a jack for support, carefully lift it up so that the top mount studs poke through the holes in the bodywork. Refit the three 13mm nuts by hand (you can see the camber alignment slots here) and then torque them down to 46Nm (34lb ft).

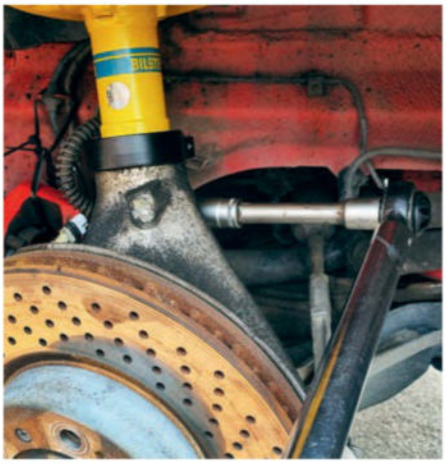




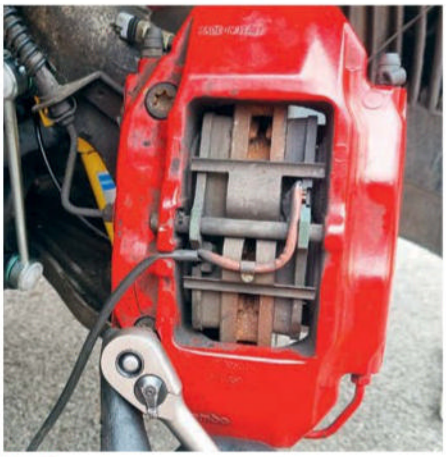
42 Make sure the damper clamp sits flush with the top of the steering knuckle and that the damper hole aligns with the droplink fixing hole in the knuckle.



43 Before refitting the new droplink/damper support bolts, make sure you grease them.

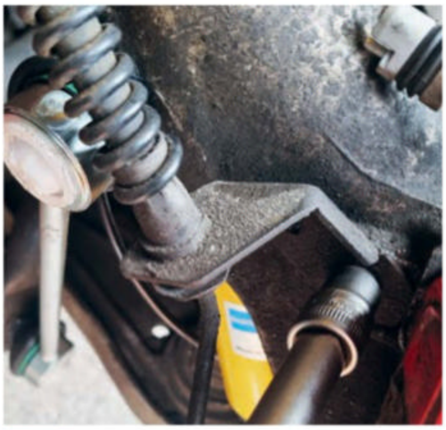


44 Tighten up the droplink pin (using a 17mm thin spanner on the droplink end) and once it has caught, tighten the 18mm nut up to 85Nm (63lb ft) using a torque wrench.

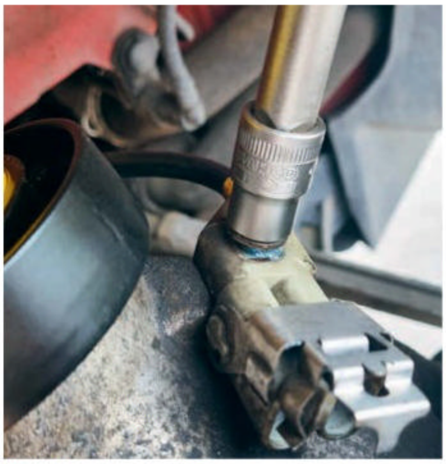


45 Refit the T55 Torx bolts securing the brake caliper to the steering knuckle. It is best to replace these with new genuine Porsche items (about £5 per bolt).

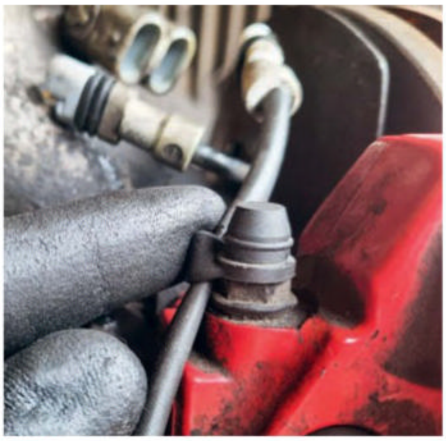
46 Reattach the droplinks to the anti-roll bar after greasing the threads and tighten them up with 16mm spanner and a T30 Torx bit to around 50Nm, then back the nut off and retighten it to 65Nm (48lb ft) with a torque wrench.



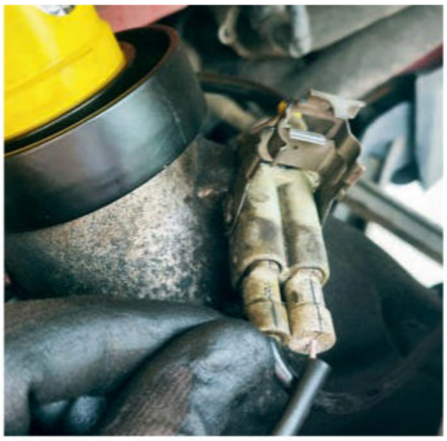
47 Refit the M6 screw holding the brake caliper bracket to the steering knuckle using a 10mm socket. Do not overtighten these as they're easy to snap off. Porsche suggest 16Nm (12ft lb).



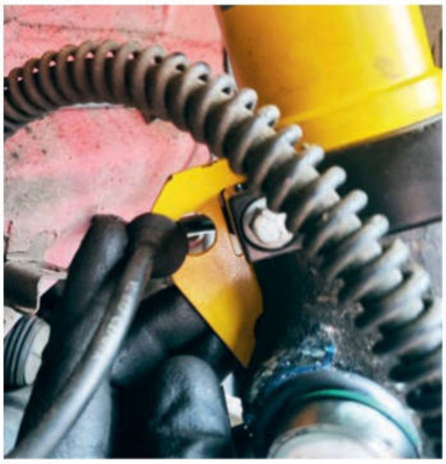
48 Reattach the ABS and brake pad wear sensor electrical socket to the hub with the M6 screw and tighten to 16Nm (12ft lb).



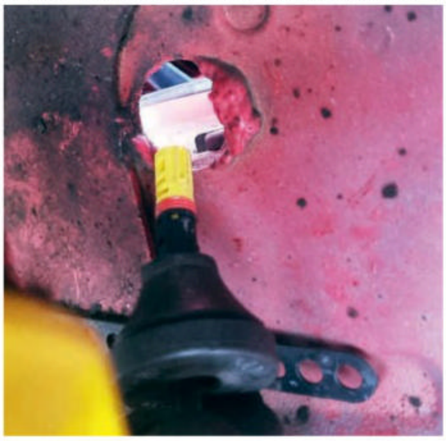
49 Reroute the brake pad sensor wire via the brake caliper – this rubber loop on the bleed nipple cover supports it on the brake caliper.



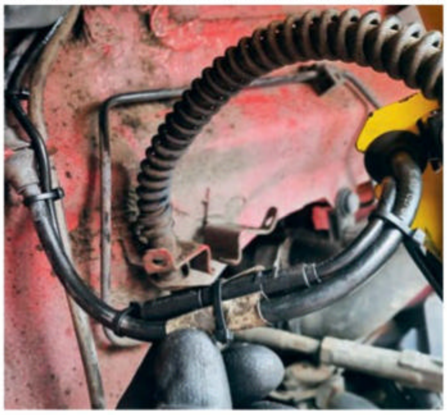
50 Push the ABS sensor and brake pad wear sensor back into the electrical socket (they only fit in one way) and secure them by pushing down on the metal clip.



51 Refit the wiring loom grommet into the suspension strut bracket to the rear of the Bilstein damper.



52 If the car has PASM (or Damptronic) then route the wiring through this pre-drilled hole in the inner wheelarch. Bilstein supply a grommet with the kit for this purpose.



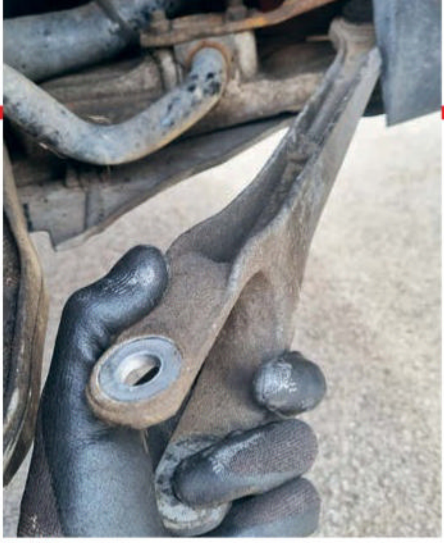
53 Make sure all the PASM wiring is secured to the cars original wiring with cable ties. Make sure the wiring can't rub against anything metal and can't flap around near the wheels.

54 ◀ Reattach the original PASM wiring to the OE socket on the car's wiring loom (the pins are marked with '1 and 2' so make sure these are correctly orientated). Clip the plug back in place in its plastic holder and use cable ties to neaten up any loose wires.

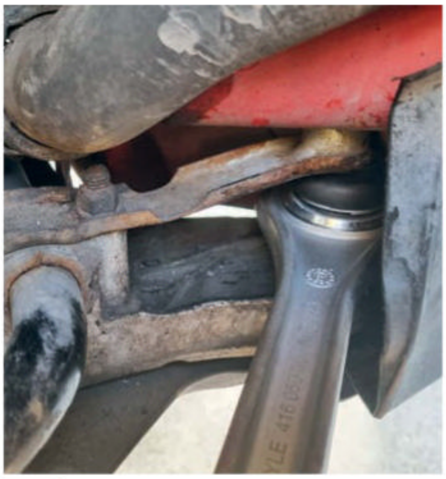
55 ▶ Refit the original plastic trim covering the top of strut hole and refit the cover panel to the car (it sits underneath the plastic wheel trim and underneath the rubber trim of the front boot storage area).

56 ◀ As the lower coffin arm wishbones hadn't yet arrived (they were fitted later and took about an hour a side) all we could do was replace the track control arms. These are secured with a 21mm nut on the top and a 18mm bolt on the underside. Loosen this bolt off with a breaker bar.

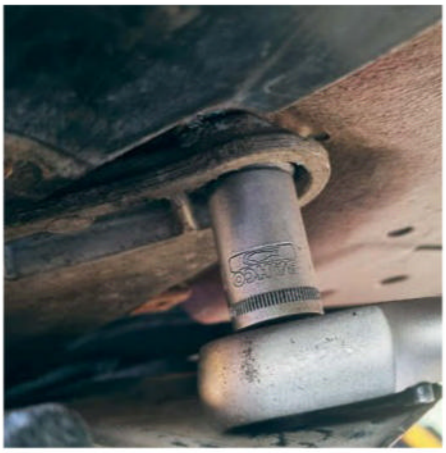
57 ▶ Use the 18mm socket and breaker bar to loosen the bolt securing the front edge of the track control arm. This uses a captive nut in the suspension subframe so shouldn't give any issues.



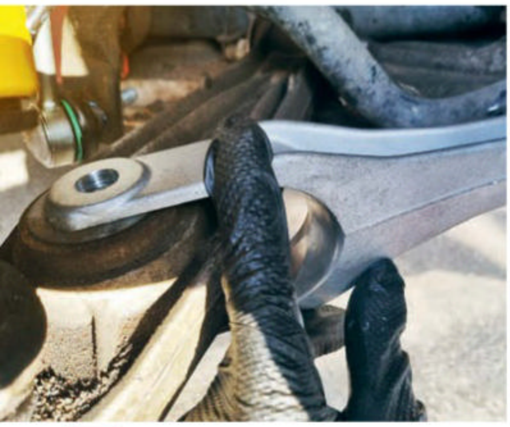
58 Remove the bolt and with the steering knuckle turned out of the way, release the rearward arm of the track control arm. It should pull out fairly easily. If the bolt is seized, you may also need to remove and replace the lower wishbone (it's wise to do these anyway with a suspension refresh).



59 Fully remove the old track control arm and then, with the bolt hole greased, slide in the front edge of the new track control arm.

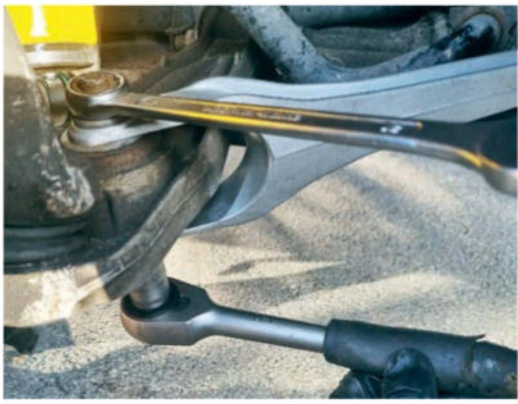


60 You may need to undo the plastic trim by the arm with a Torx screwdriver to loosen the front subframe to chassis bolt to make this a little easier as it's quite a tight fit, but the arm will go in.

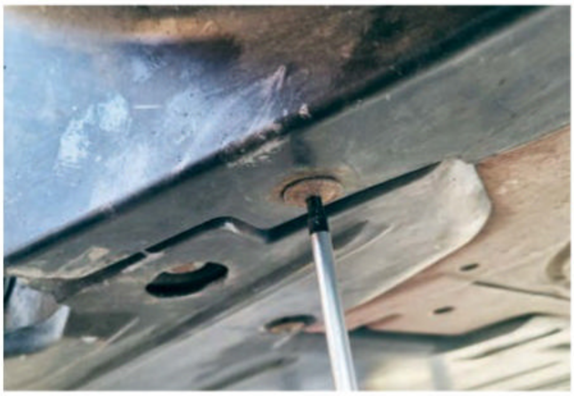


61 Refit the rear edge of the arm (also called tuning forks for obvious reasons) and align it over the bolt hole in the wishbone.

62 Grease the bolt (ideally fitting a new one) and refit it through the front section of the track control arm tightening it to 160Nm (118lb ft).

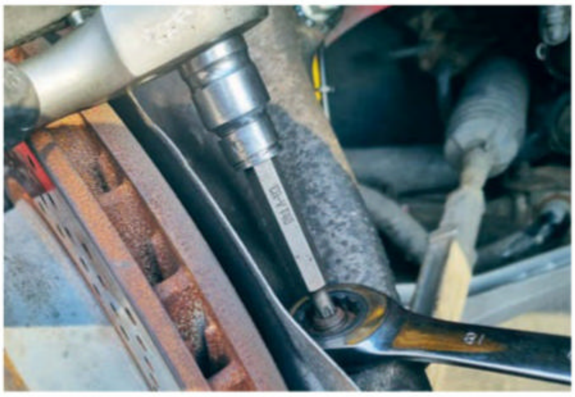


63 Ideally using a new 18mm bolt and 21mm nut, reattach the track control arm to the wishbone and torque it up to 160Nm (118lb ft).



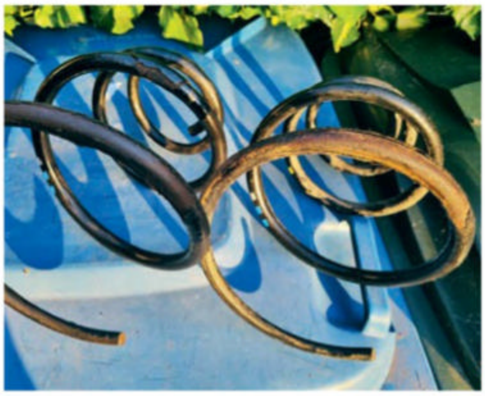
64 ◀ Retighten the subframe to chassis bolt, reattach the plastic cover trim and then refit the T20 screw, hand-tightening it fully with a Torx screwdriver.

65 ▶ Refit the steering arm to the steering knuckle using a T40 Torx socket to prevent rotation and an 18mm spanner on the nut. Torque to 75Nm.



66 ◀ On the new track control arm, you'll need to refit the brake cooling ducts. A top upgrade is to fit 997 GT3 items as they have more cooling fins. They cost under a tenner for both sides (direct from Porsche!) and simply clip in place.

67 ▶ Even though the old springs looked in good condition when they were mounted on the car, you can see how much corrosion had affected their lower edge as the powder coating had broken down with age. Finally, refit the road wheels, lower the car to the ground and torque up the wheel bolts to 160Nm (Porsche updated this figure from the original lower torque spec).



2018 MINI Cooper 1.5

F56 Service

Rob Hawkins volunteers to help service a 1499cc petrol-engined MINI Cooper at AES near York.

THANKS TO
AES York Ltd
01904 780149
autoelectricsyork.co.uk

Overall difficulty rating

ESSENTIAL TOOLS

- 10mm Hex bit
- 32mm socket
- Torx T25 and T55 bits

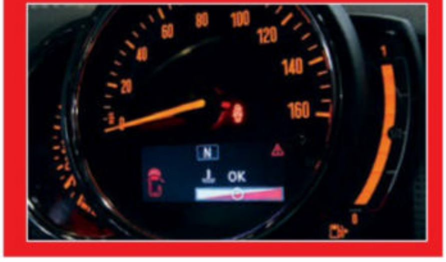
The history of the BMW MINI can seem bewildering at times with a long list of internal codenames, starting with R50, followed by R53 and R56, and then F56. In brief, the F56 (also known as the third-generation MINI), which we're servicing, arrived in 2014 and marked a major change from the previous models. The engines were now from BMW and the one we're looking at is a three-cylinder turbocharged petrol.

Under the skin of the F56, the suspension and brake components all look very familiar to that of its predecessors. And there's plenty of space to drain the oil, check the gearbox oil and inspect the suspension. The brakes are equally straightforward to strip and clean.

What's difficult to work out is BMW's recommended service intervals, which are condition based. So instead of relying on mileage or time to know when the air filter needs replacing, for example, it all depends on how the vehicle is used. Short runs won't clock up the mileage but will mean the air filter needs changing sooner than the same amount of motorway miles.

Rob says

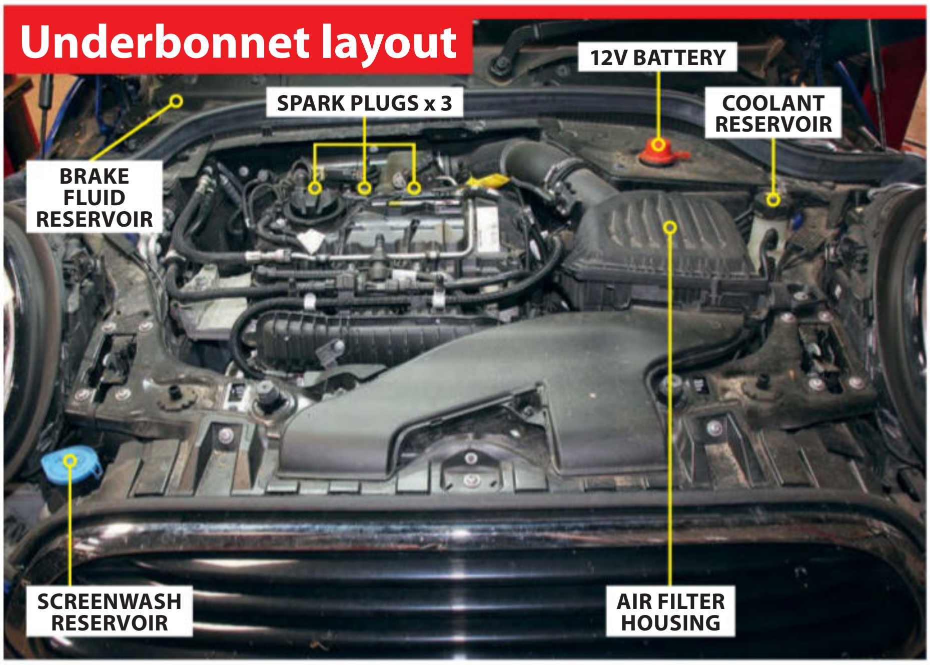
With no dipstick to check the engine oil level, it's essential to add the correct quantity (4.5 litres) and type of oil when refreshing it because it can only be checked via the controls (iDrive, stalk switch or the radio) and it may take up to 30 minutes of the engine running before this is possible!



Other aspects of servicing are easier to understand, such as the brake discs and pads, which simply need to be measured to see if they are worn – there are also wear sensors for the nearside front and offside rear inner pads.

We've cobbled together a service schedule to help outline the work that should be conducted, but you should also refer to the recommended service information displayed inside the vehicle. Talking of which, the display needs to be used for checking the oil level (there's no dipstick in the engine bay) and for resetting service jobs, such as after the engine oil has been changed or new brake pads fitted.

Underbonnet layout



UNDERBONNET CHECKS

1 REFILL SCREENWASH

Top up the screenwash reservoir in the offside front corner of the engine bay. Operate the windscreen wipers and washers to check their spray pattern and to look for blocked washer jets. Inspect all wiper blades for splits in the rubber.

2 CHECK COOLANT

Make sure the engine is cold before releasing the pressure cap for the coolant expansion tank on the nearside of the engine bay. Look inside for a MAX marker and make sure the coolant level is covering it. If it needs topping up, only use the recommended BMW blue-coloured coolant, or whatever has been used before.

3 CHECK BRAKE FLUID

The brake fluid reservoir is on the offside of the engine bulkhead, hidden underneath a small plastic access panel. To remove this panel, turn a couple of plastic trim plugs anti-clockwise and undo a 10mm plastic nut. Shine a torch on the side of the brake fluid reservoir to check the level against a MAX marker.

4 REMOVE DEBRIS

In the nearside rear corner of the engine bay, there's a similar access panel to the one shown in the previous step. It's worthwhile removing it to look inside and clear any dirt and debris that could block any drain holes.

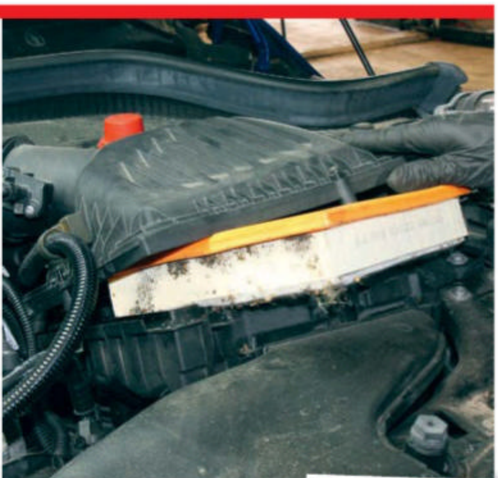
AIR & CABIN FILTER

5 UNDO LID

The air filter is contained inside a plastic housing in the nearside of the engine bay. Undo three Torx T25 screws that secure the lid of the housing. These screws cannot be extracted, so once they are fully undone and feel loose, that's enough to be able to remove the lid.

6 REPLACE AIR FILTER

Lift the lid of the air filter housing a little to be able to extract the old air filter. Clean inside the housing to remove any dirt that may contaminate the new one. Check the new air filter is the same shape and size as the old one before fitting it and refitting the lid.

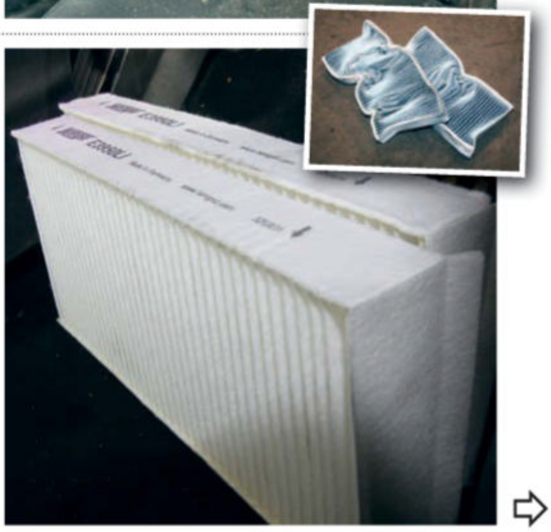


7 FIND THE CABIN FILTERS

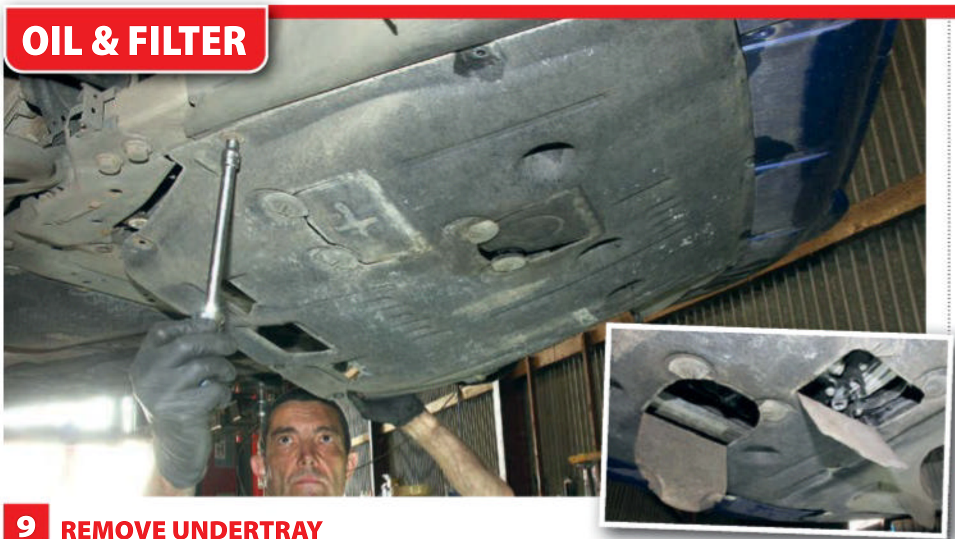
Detach a plastic trim panel to the left of the pedals (it should be clipped in position). Unclip an oblong-shaped plastic access panel near the front of the heater assembly to expose the side of a cabin filter. Try to extract this old cabin filter. Once removed, extract the second filter.

8 FIT NEW CABIN FILTERS

Make sure the old cabin filters are the same shape and size as the new ones although, in our case, the old ones were crushed. Fit one of the cabin filters into the housing (ensure the airflow arrows point to the rear of the vehicle) and make sure it drops down inside, then fit the second. Refit the access cover and trim panel.

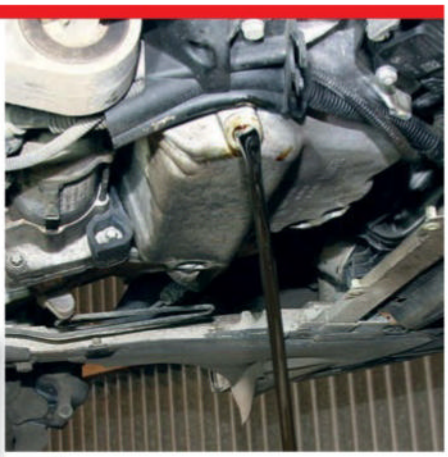


OIL & FILTER



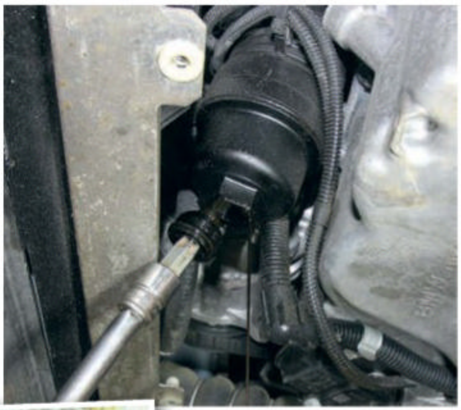
9 REMOVE UNDERTRAY

There are two access flaps on the fabric undertray that's fitted underneath the engine bay, but draining the oil can get messy, so it's easier to remove the undertray despite being secured with 15 8mm bolts! Removing it also helps to inspect the engine for oil leaks.



10 DRAIN ENGINE OIL

Position an oil drain tray underneath the engine sump, then undo the 17mm drain plug. Leave the oil to drain for several minutes and move on to renewing the oil filter – see the next steps on how to do this.

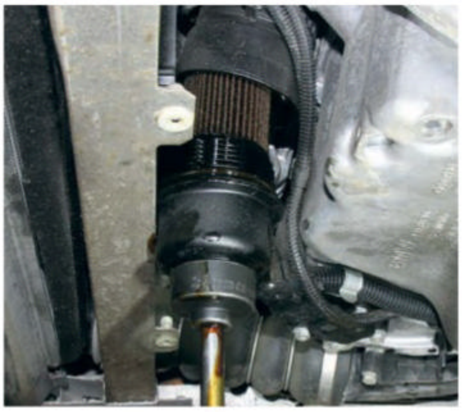


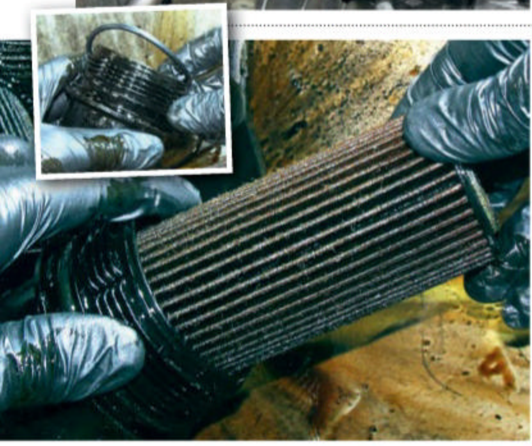
11 DRAIN OIL FILTER

The oil filter is accessed from underneath the engine bay, in front of the sump. First, undo the centre drain plug using a Torx T55 bit (some drain plugs require a Hex bit). A small amount of oil will drain, so have a drain tray underneath it.

12 REMOVE OIL FILTER

Use a 32mm socket to unscrew the plastic body of the oil filter housing. A little more oil may drip out of the housing once it is undone, so have a drain tray underneath and a cloth to clean your tools. Transfer the housing to a workbench.



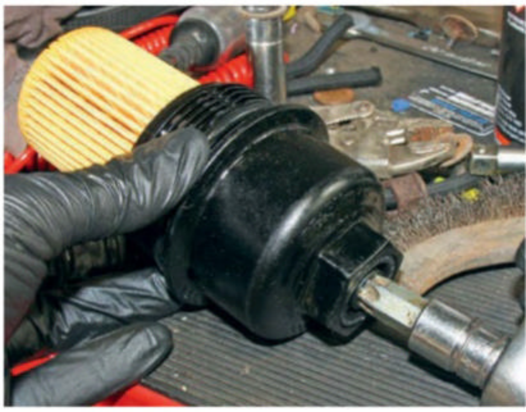


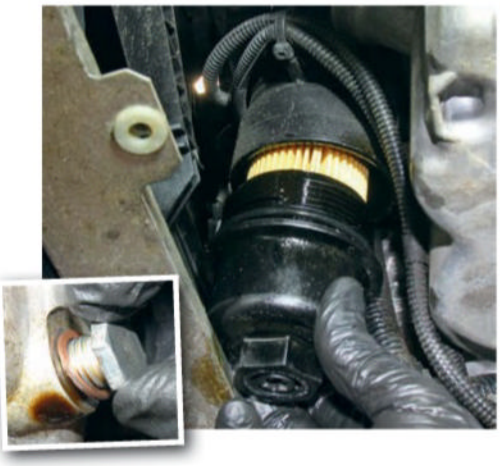
13 EXTRACT FILTER

Extract the old oil filter from the housing (pull it out) and make sure all of it has been removed. Use a pick or small screwdriver to remove the rubber seal from around the thread of the housing, then fit a new one (supplied with the new oil filter), adding some fresh engine oil to it.

14 FIT FILTER & DRAIN PLUG

Fit a new filter inside the housing, making sure it clicks into position. We found there are two types of oil filter for this MINI, so check you have the right one. Next, fit a new drain plug (make sure any seals supplied with it are fitted) into the base of the housing and tighten it to 5Nm.





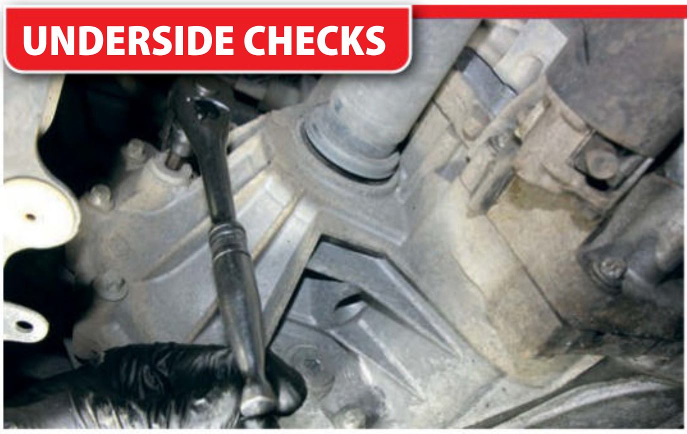
15 REFIT HOUSING

With a new seal, filter and drain plug fitted to the housing, refit it on to the engine by hand, tighten it to 25Nm, then slacken it 180° before tightening it again to 25Nm. Remove the old copper washer from the sump drain plug and fit a new one (usually included with an oil filter). Refit the sump drain plug and tighten it to 25Nm.

16 REFILL ENGINE OIL

Measure 4.5 litres of the recommended engine oil (grades vary depending on model and climate) and pour this into the engine via the filler cap. Run the engine up to operating temperature, check for leaks and operate the controls to check the level. Switch off and top up if required.

UNDERSIDE CHECKS

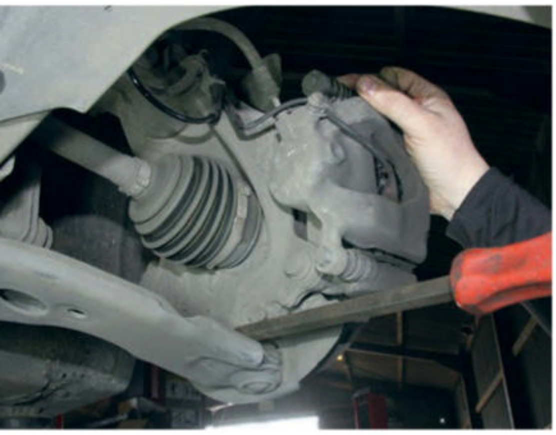


17 CHECK MANUAL GEARBOX OIL LEVEL

The offside face of the manual gearbox (next to the engine) has a drain plug with a filler plug above it. Use a 10mm Hex bit to undo the filler plug, then check inside to ensure the oil level is just below this hole. Top up with MTF2 or 3, depending on the age of the vehicle. Tighten the filler plug to 43Nm (+/-4Nm).

18 SQUEEZE GAITERS & BOOTS

Squeeze the corrugated rubber gaiters around the CV joints on the ends of each driveshaft and on the steering rack and any balljoint dust covers to look for splits in the rubber and escaping grease. Any damage could allow water and dirt to get inside, resulting in premature wear.

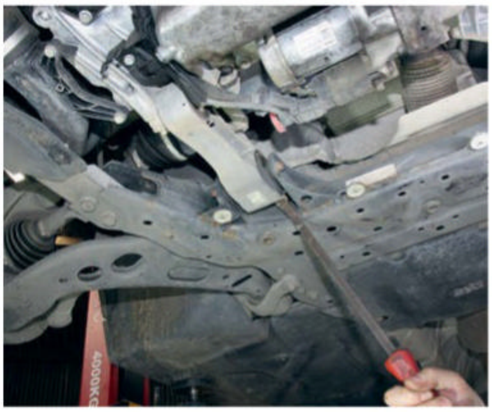


19 LEVER BALLJOINTS

Use a pry bar to lever against the outer balljoint on the end of each front lower suspension arm. There should be no movement in the balljoint. It's a pressed-in component so if the balljoint is worn a new front lower arm costs upwards of £120.

20 CHECK INNER MOUNTS

The inner mounting points for the front lower suspension arms can also be checked with a pry bar. The rearmost mount is known to wear and can be replaced separately, so you don't have to buy a new suspension arm.

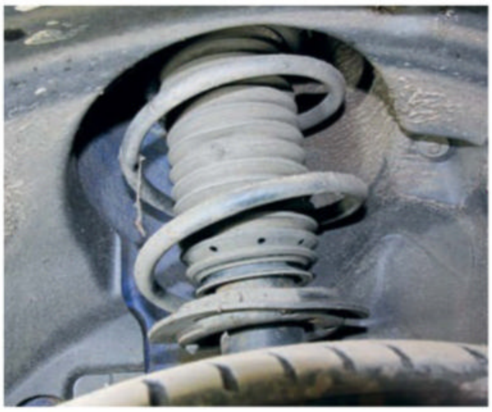


21 INSPECT GEARBOX MOUNT

The dog-bone-shaped lower gearbox mount can be checked with a pry bar by levering against its mounting points. A replacement arm costs around £50, or the same amount for polyurethane bushes.

22 CHECK FRONT COIL SPRINGS

The front coil springs can be visually inspected over the tops of the tyres (more so if the vehicle has been raised, so the wheels and suspension are hanging down). Look for fractures and corrosion.



23 CHECK REAR COILS

Visually check the rear coil springs, looking for fractures and excessive corrosion. Look around the body of each telescopic damper for signs of oil residue (misting), which may suggest it is leaking.

24 LEVER SUSPENSION ARMS

Use a pry bar to lever against the mounting points for the rear suspension arms. Excessive movement in a mounting bush may cause handling issues and uneven tyre wear. Replacement arms are in some cases quite cheap, such as a rear lower arm at around £35.

UNDERSIDE CHECKS CONTINUED

25 CHECK BRAKE HOSES & PIPES

Inspect all the brake flexi-hoses and pipes underneath the vehicle to look for cracks in the rubber, corrosion in the pipes and leaking fluid. Check all pipework is securely fitted, including the handbrake cables.

26 INSPECT EXHAUST

Starting at the rear underside of the vehicle, inspect all rubber hangers and mounting points for the exhaust system to ensure they are intact. If it's safe to run the engine and stand underneath the vehicle, listen for leaks from the exhaust system.

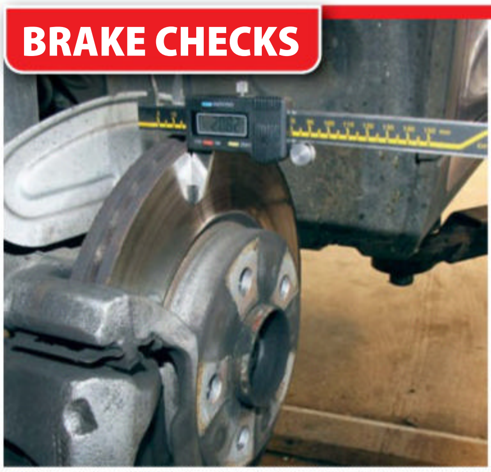
27 WIGGLE WHEELS

Wiggle each raised road wheel from top-to-bottom and side-to-side to check for play in the suspension bushes, wheel bearings and steering components (front only).

28 SPIN A WHEEL

If you suspect a wheel bearing is worn, try spinning its road wheel when it's raised. The noise from the worn wheel bearing can often be heard and it may also be transmitted through to the coil spring – touch the outside of the coil spring to feel for excessive vibration.

BRAKE CHECKS

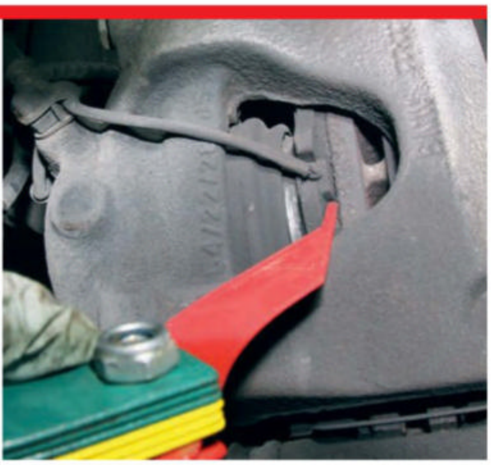


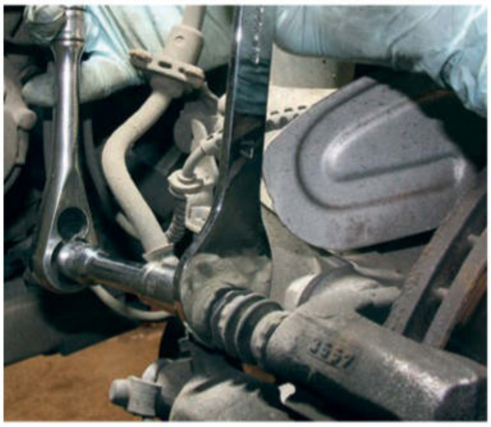
29 MEASURE DISCS

The thickness of the brake discs can be measured from inside the wheels, through the spokes or after removing a wheel. The minimum recommended thickness is 19.6/7.6mm (front/rear), but if new pads are being fitted, it's 20.4/8.4mm (front/rear).

30 CHECK PADS

Manoeuvre a brake pad thickness gauge on to the edge of a brake pad to check the thickness of the friction material. The recommended minimum thickness is 3.7mm. If one pad is worn below the limit, all the pads across the axle (front or rear) must be renewed.



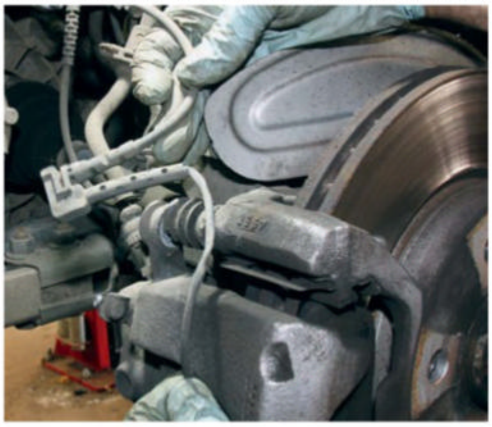


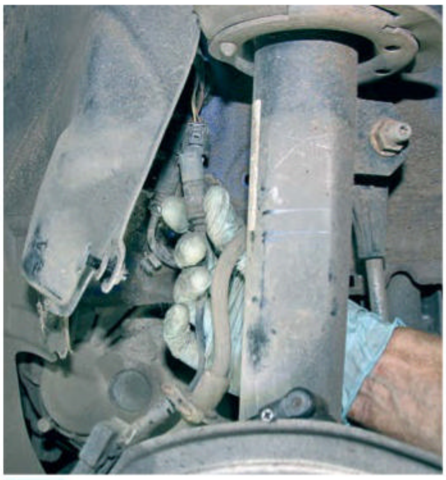
31 REMOVE CALIPER

If the brake pads need changing or you wish to remove and clean them, then start by removing the caliper. On the front, undo two 13mm bolts for the slider pins – they will probably rotate, so grip them with a slim 17mm open-ended spanner.

32 DETACH WEAR SENSOR

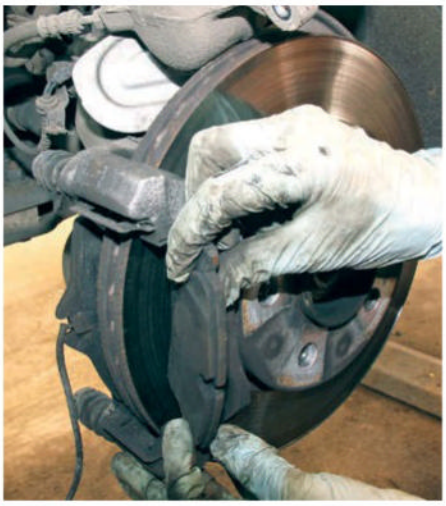
When removing the brake pads from the nearside front or offside rear, the end of the wear sensor wiring will need to be detached. It clips into the side of the inner brake pad.





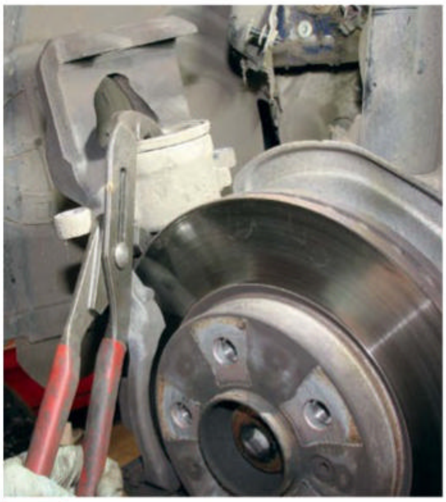
33 REPLACE WEAR SENSOR

If the brake pads are being replaced and a warning has been displayed on the dashboard to indicate they need to be changed, then the wear sensor will also need to be replaced. On the nearside front, peel back the inner arch liner (secured with 8mm bolts and trim plugs) to find the plug for the wiring and detach it.



34 REMOVE PADS

The brake pads will probably remain sitting inside the caliper carrier after removing the caliper (suspend it on top of the brake disc to avoid overstretching the flexi-hose). Prise them out by hand or with a screwdriver (avoid damaging the edges if you are refitting them).



35 RETRACT PISTON

Use a pair of water pump pliers or a windback tool (essential on the rear calipers) to retract the piston inside the caliper. This helps to make room for fitting new brake pads, but to also check the piston isn't seized. Check the brake fluid hasn't spilled over in the reservoir (see *Step 3*).

36 CLEAN CALIPER & CARRIER

Spray brake cleaner over the caliper carrier and inside the caliper (not the rubber dust cover around the end of the piston), then use a small wire brush to clean them to remove brake dust and dirt. If the pads are being refitted, clean their edges.

SERVICE SCHEDULE

GUIDANCE ONLY

EVERY 12 MONTHS

- Change engine oil & oil filter
- Check coolant level & test concentration
- Check tyre condition, pressure & tread
- Top up screenwash fluid
- Check battery
- Check wiper blades & washer jets
- Check all underbonnet components & hoses for fluid leaks
- Inspect brakes
- Check steering & suspension components
- Check auxiliary drive belt
- Inspect exhaust system & mountings
- Check operation of all electrical systems
- Lubricate all locks & hinges
- Check brake fluid for moisture content
- Check gearbox oil level

EVERY 24 MONTHS

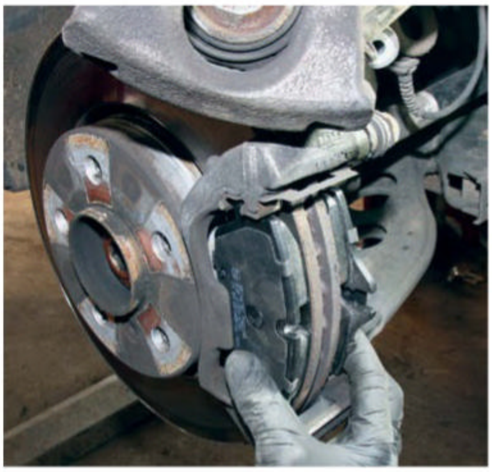
- Replenish brake fluid
- Renew cabin filter
- Renew air filter

EVERY 50,000 MILES

- Renew spark plugs (tighten to 23Nm (+/-3Nm))

Don't forget to also

- Inspect the tread and sidewalls of the tyres for uneven wear and damage
- Tighten the road wheel bolts to 140Nm
- Wiggle the ARB droplinks
- Lube locks and hinges
- Inspect the seal around the fuel filler cap

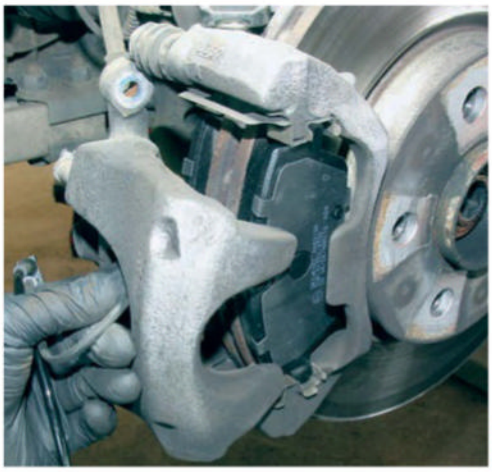


37 REFIT BRAKE PADS

Fit the new brake pads or refit the old ones in their original locations. Make sure they sit fully inside their shims and the friction surface is tight against the face of the brake disc. If they prove difficult to fit, remove the shims and clean the caliper carrier where they sit.

38 REASSEMBLE BRAKES

Refit the caliper and attach the brake pad wear sensor (nearside front and offside rear) to the edge of the inner brake pad. Fit new bolts into the slider pins and tighten them to 35/30Nm (front/rear). After servicing the brakes, pump the brake pedal and then check the brake fluid level.



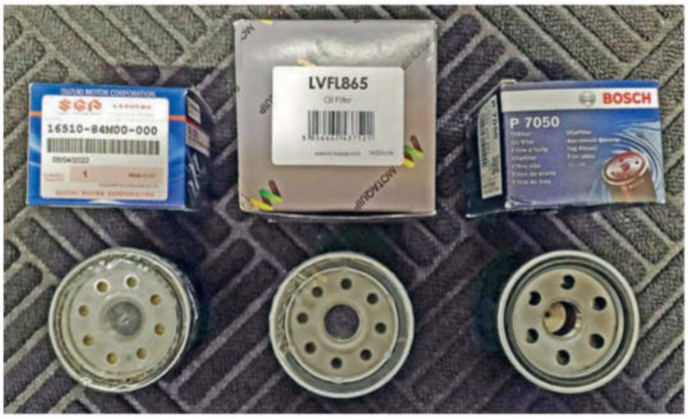
Your Letters

Please send your letters either by writing or sending an email...

E-MAIL to:
martyn.knowles@kelsey.co.uk

WRITE to:
Martyn Knowles,
***Car Mechanics*,**
Kelsey Media, The Granary,
Downs Court, Yalding Hill,
Yalding, Kent ME18 6AL.

Please include a postal address with letters submitted by email.



QUALITY OF PARTS

I read with interest when Mike Humble stated that Bosch is merely a trading name these days in his *In my Humble Opinion* column in the November 2024 issue.

I was surprised to hear this having used Bosch products for many years for serviceable items. Personally, I find them to be of better quality and more cost-effective than genuine parts.

Above is a picture of three different brands of oil filter for a Suzuki Celerio. Given the price of a genuine filter is now *circa* £15 (seemingly very expensive as it's absolutely tiny), I decided to see what else was on the market from brands I have come to trust in the past.

Aside from the cost (Bosch being half the price of genuine Suzuki, and Motaquip being less than £10) the differences I can see are:

- Suzuki and Motaquip are sealed with a plastic cap.
- Motaquip and Bosch look to have a metal baffle where the Suzuki does not (paper element is clearly visible).
- Bosch has less drain holes but these are larger in diameter.
- Motaquip has crimping of the rubber seal.

Time will tell if this is a viable cost saving measure. However, I will be saving the Suzuki one as a spare come the next service just in case I have any issues.

Peter Walmsley

CONTINUAL DAMAGE

Reading your *Editorial* in the September 2024 issue about the Peugeot 208 damage – it sounds like my own car – a March 2017 Volvo V40 D4 R-design. I bought it in November 2017 with 10,000 miles. Around a year later, I hit a badger. Smashed the lower radiator grille and buckled the bumper. New grille and a hairdryer on the bumper cured that.

Forward into 2019, a deer run out in front of me – bumper, headlight, slam panel and lots of plastic. Insurance repaired the car. Mere weeks after getting it back from that, a pick-up changed lanes on a dual carriageway into the side of me and bashed the wing – I pushed it out a bit myself but left the wing as is.

2021, a crow was hit which damaged the top grille – I was able to find the broken piece and fix it. Again, mere weeks later, ANOTHER deer – top and bottom grille smashed and damaged plastic behind the bumper. This time sorted with glue and cable ties, and a bit of stainless steel mesh to replace the smashed top grille.

2024, another driver changed lanes, this time into the other wing – this one was fixed courtesy of the third party's insurance.

My poor V40 has had more hits than the Beatles! She's now on 210,000 miles though and I don't really want to change – besides the bashes, we've helped to set a world record together (TorqueVolvo at Elvington in 2021). We've been all over the country, and she still drives really nicely. I just wish she was a different colour to the metallic invisible that she appears to be...

Chris Turner

FOCUS TIPS

Great article on the Focus Mk2 timing belt (*CM*, Jan25) – but a couple of things to point out. The tangs that prevent the thermostat housing can be overcome by using a Focus Mk3 1.6 item which Circoli sell for £60 as this fits perfectly without having to spend a fortune on the Ford part or filing it down.

Also there is a tool that's commonly available for the auxiliary belt. You can get them on eBay and it's designed for twin pulley auxiliary belts, it bolts to the water pump pulley and winds the belt on very easily. I think off hand they were about £40-50. The usual ones that clamp on to the crank pulley won't work on twin pulleys.

Tom Hallam

BLINDED BY THE LIGHT

More and more I feel that modern car lighting has gone utterly mad. It began with fairground style brake-lights, then rear lamps began to take on outlandish designs too. However the eye-burning LED headlamps are becoming dangerous in that as the car rides a slight rise in the road it can mistaken for a headlamp flash calling someone on. I have seen two accidents caused by this phenomena. The new trend of fitting indicators low down in the rear fender is far from sensible – remember Volvo used to put the rear lighting up the tailgate pillar! VW and others also have miniscule indicators that become hard to see in sunlight, and as for reverse lamps: useless!

The main issue though is cost to the owner. I was complaining to a mechanic pal that I'd had a devil of a job fitting the H7 bulb in my Rover 75 because its more a feel than see job. He laughed. "I've had a fairly new Renault in the other week. Out of warranty but failed the MOT because the LED headlamp had failed. Cost? £2000 for the part, plus labour in dropping the front bumper assembly, and you're moaning about fitting a £14 bulb."

I was stunned. Frankly I'm going to stick with my older cars.

Karl Sheridan

AIRCON RECOLLECTION

I had to smile with the recollection of my brush with aircon – reading *Tales from the Workshop* (*CM*, Feb25), Aircon Failure in a Ford Focus. I never use mine, but I live in the West Country. An amazing case came my way, a while ago. A Jaguar owner found that when he took the keys out of his ignition, the engine stayed running! With two huge fuel tanks it could be very expensive to let them just run dry. So he called upon the services of the AA, and they removed fuse after fuse until the engine died. I helped out. The engine started perfectly, and switched off perfectly, when cold. But once the huge radiator fan cut in, it was permanently running. Even when the fan stopped, the engine didn't.

A situation not helped by Jaguar themselves as they held onto the latest car circuit diagrams like gold dust! Only when considered old enough were they sent to the Jaguar car club for distribution. This one, was halfway between the two, with no one having a circuit diagram. We plodded on, and slowly traced the supply voltage for the engine here and there.

A very clever trick was using coloured traces along the multiple black wires to help mechanics follow, and trace a wire. But when it came to a 40-pin round connector, it became a different ident colour. A yellow stripe wire became a blue stripe wire. Who would have thought it. Anyway, we carried on around up and down, to under the dash. There it vanished into the aircon unit. Unused for many a year!

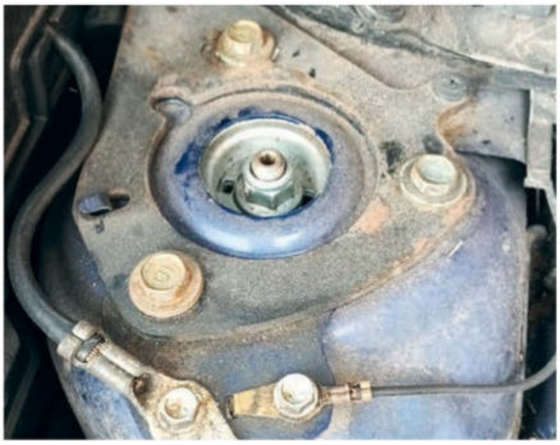
With a two-pin series connector found, we withdrew it, and the engine died. The fan still worked, and the ignition switched the engine on and off, hot or cold. The aircon didn't work and hadn't for ages. Did he want it repaired? No, so we left the two-pin connector out, and taped it to one side, just in case someone ever decided to repair the faulty aircon.

Hugh Rogers

A WORD OF WARNING

My wife's Mazda3 had been making an increasingly frequent knocking from the NSF corner for about four months, which sounded very much like a lower balljoint. Initially when pulling away, and then also over bumps. Started about one month after the MOT, which had no relevant advisories. Numerous times I've been under the car examining the suspension components, with no obvious culprit. I was further perplexed as almost all of the front suspension components had been replaced at some point within the last three years, due to wear and tear.

The noise recently got a lot worse, so I had another look. It transpires that the nut attaching the top of the shock absorber to the top mount had worked itself loose, and I could replicate the noise by wobbling the top of the shock absorber from under the bonnet. The issue was only evident when the car was not jacked up.



It seems that it had worked itself loose over two years since the replacement, and had it got much looser, the consequences don't bare thinking about.

I learned two important lessons from this:

1 Ensure that components are torqued property, even if purchasing extra tools are required. I hadn't managed to use a torque wrench when I installed it as the shock needed to be braced with an Allen key whilst tightening the nut with a spanner.

2 To seriously consider using some form of marking on the nut and thread, so that any movement will be obvious early on.

I hope this serves as a warning to other readers and might prevent an accident.

Peter Morris

STAR LETTER

The reader awarded the STAR letter will receive a Sealey LED318G lamp

- Features stepless dimmer switch for both the main COB and the LED torch.
- Featuring a super bright 5W COB LED light source, which gives an even and constant spread of light, producing up to 400 lumens.
- Built-in emergency power bank to charge mobile devices.
- Top 3W high power LED torch producing up to 100 lumens.
- Integral hanging hook/belt clip and a magnetic base which can rotate through 180° for hands-free applications.
- Features a battery level indicator.
- Rechargeable 3.7V 1.2Ah Li-ion battery for longer life, no memory effect and a much slower discharge than traditional Ni-MH batteries.

SEALEY

KEY FOB REVAMP

SGP
37186-81A00
SUZUKI MOTOR CORPORATION

In relation to Peter Simpson's 'Cheaper new...' article in *Dealer's Diary* section of the October 2024 issue I had a related experience when replacing the key fob battery in our Suzuki Celerio.

Changing the battery was a simple affair bar not being able to source a battery locally (CR1616 – but eBay came up trumps). Whilst there I noticed the retaining screw looked worn so decided to replace to save issues in the future. A quick trawl of eBay found new ones available between £8-10 each (ignoring the 'pattern' fob repair sets that never fit well). A bit much I thought for a tiny little screw! A quick call to our local 'Suzuki' dealer resulted in getting one for just £1.80!

You do have to question how sellers can warrant such a 'mark-up' even taking into consideration fees & postage. In any case, for less than £4 we now have a fully working key fob!

Peter Walmsley

BAD ENGINE EXPERIENCES

You asked about any experiences with bad engines. I recently went to look at a 2019 Ford Focus 1.0 auto with 19,000 miles. The car was in great condition – when I questioned the owner as to what the problem was he said it started making a loud noise when started that morning. I started the engine but switched it off after a couple of seconds as the noise was certainly terminal. A quick compression test revealed no compression on No.3 cylinder. I checked the cylinder with my endoscope and was shocked to see a 5cm piece of metal missing from the side of the piston crown.

The car had just been serviced the week before (non-Ford garage). After a lot of calls to Ford, they didn't want to know and we had to source a replacement engine from a specialist breakers in Beverley.

An independent examination of the engine came to the conclusion that it was a manufacturing defect, but again no joy with Ford.

It's a pity no aftermarket supplier has not come up with a chain conversion – would make a fortune.

Alan Balderstone

TOO MANY VALVES

Have I spotted your deliberate mistake, or has the Renault/Nissan 1.2 engine on page 79 (*CM*, Mar25) really got eight valves per cylinder?

Richard Langdon

MARTYN KNOWLES REPLIES: Oops! That should, of course, have said four valves per cylinder. Well spotted.

OLDER CARS

In view of the public lack of enthusiasm for electric cars, I wondered if more people will be looking to fit a reconditioned engine to their cars rather than buying a newer one, particularly as modern cars do not appear to rust appreciably. A few years ago I remember looking at old Citroën BX models in the scrapyard and being unable to find any rust on the bodyshell. It is a waste to break up a car in such good condition.

My other comment about older cars is that I and a friend of similar age have both stated that if we could get a Ford Escort, meaning the first generation of the front-wheel-drive model, we would never consider buying any other car and that newer models by every manufacturer all appear to rather dull and exactly the same.

Paul Brown

FRANCHISE MOVEMENTS

I read with interest Peter Simpson's 'VW dealership shake-up' article in *Dealer's Diary* November 2024 issue. Where I live there once was a very large Vauxhall franchise – Perrys – who lost their contract with Stellantis, replacing it with Kia as their No.1 brand.

The impact has been stark. Once the roads were awash with Vauxhall cars but now these are increasingly uncommon – being replaced by you guessed it, Kia!

I think manufacturers like Stellantis didn't appreciate the 'dealer loyalty' or convenience these sites offered to their customer base.

Have Volkswagen watched and learnt lessons from the early adopters given they are doing things differently? Time will tell.

Peter Walmsley

Help!

Your *non-diagnostic* vehicle-related problems solved by **Steve Rothwell**

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FORD TRANSIT

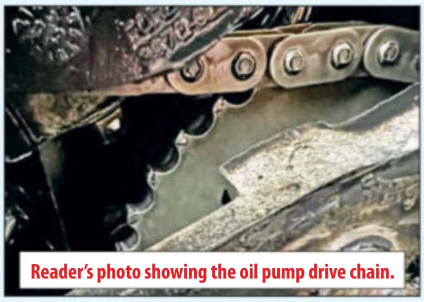
Timing chain advice

Q I've got the timing cover off on my 2004 2.4 TDDi Ford Transit and it looks like the oil pump chain tensioner is knackered. I've attached a photo of the sprocket plus links to a couple of videos. Which can be seen at these links: **https://bit.ly/CMktNpz** and **https://bit.ly/CMQCU8s**

In one video you'll see I push down on the oil pump chain tensioner with a screwdriver, but the rattle doesn't really change. Do you think there could be something else making the noise, other than timing chain? It looks like the timing chain tensioner is doing its job. I'm on a very tight budget which doesn't help. Obviously, I need a new tensioner and chain on the oil pump, but I wasn't sure about the teeth on the pump sprocket. I can't buy that on its own so it would mean another £90 on a new pump. Do you think I can just fit a new chain and tensioner on the existing oil pump?

Many thanks for all your help.

Richard Davis



Reader's photo showing the oil pump drive chain.

A The videos do show an excessive amount of play in the chain, which does confirm that the chain and tensioners do need to be replaced. Looking closely at the teeth on the picture you have kindly sent, this does also appear to show significant damage, and so whilst replacing just the chain and tensioner would possible reduce the rattle for a short time, I would not be confident that this would be short lived and I would suspect the damage on the teeth of the drive sprocket to cause significant wear to the new chain in a short period.

FORD FIESTA

Update & key problem

Q I would like to thank you for all your information given prior to finding the problem with the valves in the cylinder-head on our Fiesta S1600. Also thank you for featuring the problem in your *Tales from the Workshop*. Unfortunately our problems didn't end there.

The number 2 cylinder in the engine, where the burnt-out valve was, had an oval bore. Park Engineering of Malton, North Yorkshire didn't like what they saw on photos we showed them. The engine and gearbox were dropped out of the car, separated and taken to Malton for assessment.

The oval bore was detected, so a re-bore was necessary. Ford said that these engines were not repairable, but Chris at Park Engineering found a supplier for pistons. The engine is now bored plus half a millimetre, the crankshaft was OK, so new big end and main bearings were fitted.

Everything was returned to me and having re-assembled it all with some new ancillary parts, ie. cambelt kit, clutch assembly and catalytic converter, the engine is now back in the car. Having deleted all previous codes, the engine now runs as good as new. We now have some more work to carry out to get the car ready for an MOT test then the engine can be run in properly.

I have a question to ask regarding keys – I have a solid key which gains me entry and starts the car no problem. I also have a key fob type with buttons. A new blade was supplied and cut by Timpson but it will not start the car. It gives me entry with the buttons and opens the hatch but putting it into the ignition only illuminates the relative warning lights and will not start the engine. I understand this key fob needs programming. If so, is this programming something I can do myself or will I need to enlist a locksmith or maybe a dealer? I would appreciate your thoughts.

Ian Macklin

A The remote locking and the immobiliser systems are separate, and the key will need programming into the vehicle using diagnostic equipment to pair the immobiliser chip with the vehicle. On some earlier Ford's this was possible using a working key, unfortunately on your Fiesta it will need to be done by the dealer or an auto locksmith. I would expect the latter to offer a better price on the programming.

FORD EXPLORER

Electrical problems

Q Thank you for your previous information regarding the ignition switch on my 1997 Ford Explorer 4.0 V6 automatic. Now I have another infuriating electrical problem. The interior lights, window lifts, sunroof, front and rear wipers are not working.

Removing and replacing fuse 25 in the interior fusebox restores all operations for approximately 3-4 seconds as does removing/replacing the negative battery lead. I found a relay (one of five) under the dash that clicks in time with fuse R/R. Swapped relay with another of same value, but fault remains. I also found another relay in the rear compartment (one of six) that when removed prevents front relay from operating and I am somewhat confused now.

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FORD FOCUS

Turbo leak

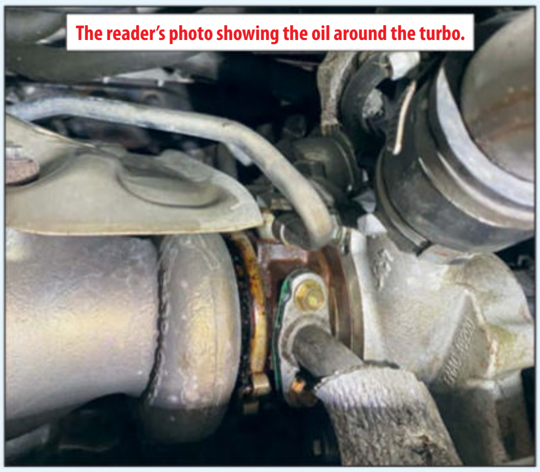
Q I would appreciate your opinion and the benefit of your knowledge. I have a 2014 Ford Focus 1.6 EcoBoost Titanium Navigator, with 64,000 miles with 18 oil and filter changes since purchased. Serviced every six months regardless of mileage. I'm afraid I'm old-school and like to keep the machinery in order.

My problem is a persistent oil leak from what I assume is the turbo (see picture). I had thought that it was from the oil return pipe and wrote to you a while back about how tight the pipe should be torqued. Anyway, I moved on to the strap thing that holds the two halves of the turbo together and managed to tweak the nut holding the 'strap'. That hasn't worked and now the leak is getting worse.

The problem is that access from underneath to see where exactly the leak is coming from is very poor and looking at the leak now there seems to be a bit of carbon (burned oil?) build-up of the 'strap'. It looks to me like an engine out job to get at the turbo properly and as I'm two months off my 72nd birthday, I reckon that this may be a job too far. Any thoughts or opinions would be handy.

I had the timing belt and water pump done at a local garage seven months ago as I wasn't up to that, and they were doing my daughter's dreaded Fiesta 1.0 EcoBoost. I have looked for oil leaks around the cam cover and timing cover area and can find none.

Arnold Holmes



The reader's photo showing the oil around the turbo.

A The oil feed and the return should be the only areas that the oil can leak from. I can see from the picture that you sent that the oil return gasket and the area of the feed pipe does appear to be covered in a light coating or oil. This may be due to the copper washers on the feed pipe, and if possible, I would first try and see if this union can be nipped up.

Ideally doing this when warm would be preferable, but due to the danger of burning, caution should be taken. This does have a quite low torque setting of 18Nm, although it would be a struggle to get a torque wrench on the feed pipe fixing.

I would consider fitting a couple of new copper washers to the oil feed pipe union, as I would suspect that this is the most likely area of the leak.

I suspect the carbon type deposits that can be seen around the clamp ring on the turbo body are simply the result of the escaping oil contacting the hot surface and not a direct result from any leak in that area.

Any clues as to where to look next would be greatly appreciated.

Roger Vincent

A Fuse 25 covers instruments via the multifunction control module. The relays in the rear control the central locking and the fog lights and trailer lights. The connection between the circuits would be the multifunction control module/combination control module unit which is located in the centre upper section of the dash behind the centre air vents.

I would start by locating this module and then checking the connecting plug. This may be a simple matter of corrosion or verdigris on the terminals which is preventing the circuit from completing. This can give a range of what may appear to be unconnected problems.

As with all electrical issues I would also ensure that all the earthing points are clean, and it may be the case that a poor earth on one part of the circuit is causing the issue. Check the under-bonnet earths on the battery and engine to body, as well as the interior and rear compartment.

As the problem can be reset by removing the fuse or disconnecting the battery, it would appear to be related to a relay resetting, and having proved that the actual relays are operating, then the circuit on the relay may be the next area to check. A low current flow caused by a poor earth would be a likely candidate for the problem.

FORD MONDEO

Gasket change

Q I'm emailing you hoping you can advise me again, this time on a cam cover gasket change on a 2001 Mk3 Mondeo 2.0 petrol (Duratec HE engine with manual transmission).

I've just changed the gasket (FAI gasket from ECP) and noticed as I torqued the 8mm bolts down, there's a gap between the rocker cover and the cylinder-head, of about 2mm to 3mm all round. I went round again checking the torque and this gap is still there. The gasket seems to sit on the inside edge of the cylinder-head, so is recessed when the cam cover is on and torqued down.

I didn't think to check if there was a gap before I dismantled it. The new gasket could only go in one way, so I'm pretty sure I did this correctly along with the spark plug gasket.

It's the first time I've done this sort of job before. I cleaned both surfaces fully using brake cleaner and put a bit of RTV sealant on the join between the cylinder-head and timing chain cover.

I've took the car for a good run of about six miles and there are no leaks as yet. I torqued all the bolts to 10Nm as per the Haynes manual.

Is this gap normal? Thanks for any help.

Ian Rimmer

A The small gap is quite normal as the seal is achieved at the gasket, which does sit into the recess in the cam cover. The cam cover to the head joint is not a face fit, and so the small gap you have is a perfectly normal occurrence. The seal is achieved slightly within the outer edge.

The manufactures allow a tolerance here as if the two faces met, when the bolts were torqued up, then sufficient pressure may not be applied to the gasket, and this could allow oil to escape. This also allows for the cover to be nipped up if needed as the gasket quality deteriorates.

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LAND ROVER

Limited gears

Q I have owed numerous Range Rovers from Classic, P38, L322 and now the ever-problematic L320 Range Rover Sport. It is a 2008 model HSE with 2.7-litre V6 diesel. It has been regularly serviced. Both differentials and driveshafts overhauled, new rear brake calipers and gearbox serviced, etc. The usual run of the mill for this vintage.

A quite annoying problem occurs when driving. The dreaded message appears – 'limited gears available'. Park brake fault. HSE inactive. Air suspension fault. The gearbox enters limp-home mode and air suspension deflates. A quick key bang and all is reset for a few more miles.

I've researched online and checked…

- Brake light switch
- Rear brake light bulbs
- Changed alternator to brand new
- Fitted a new battery of correct type.
- All the major electrical connections and plugs checked.

Diagnostic check says communication loss with transmission/transfer case TCM. Wiring looks good at TCM as does the internals.

I was wondering if you have encountered this problem in the past and help would be appreciated before the parts cannon continues to fire!

John Rafferty

A The loss of communication that you have found would be the most relevant and this would certainly be the point to initially investigate further. The wire from the transmission control module to the engine control module is Green/Orange.

But the Yellow/Black and Yellow/Brown pair of wires are those for the CAN-bus circuit, and this I suspect may be the most relevant. The slightest resistance in the CAN-bus circuit will cause a fault to occur and prevent correct communication.

This pair of wires also goes on to connect with the parking brake module and the transfer module, and the break in the circuit could be at any point, and so not necessarily between the engine control module and the transmission control module.

As CAN-bus circuits rely on a two-way communication if the signal is interrupted at any point this can cause several faults to appear.

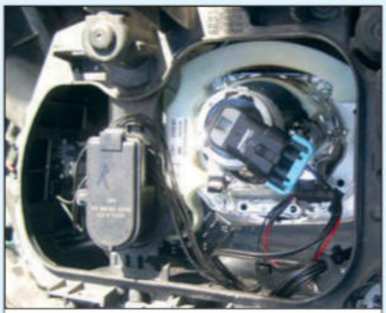
I would certainly investigate the possibility that at some point in the controller area network, that a poor connection or broken wire is present. This would include the connecting plugs to the transmission control module, the engine control module, parking brake control module, ABS module and the transfer box control module. In fact, at any point you see the Yellow/Black and Yellow/Brown pair of wires.

Using an oscilloscope is normally the best way to check the CAN-bus wiring, but with a good ohm meter and a little patience, this is possible.

Having received the communication lost message the connections and wiring which may be preventing the communication would be the best area to concentrate on.

LANDROVER FREELANDER

Headlamp



Pictures of the Freelander headlamp.

VPDH5X-13A105-AA
8509
2012/11/01
UKRH1
HB3

Q I have been an avid reader for over 40 years and always enjoy the *Help!* section articles because even if it's not exactly my own current vehicle, quite often the issues also apply to a wide variety of vehicles. But I have never asked a question before this. In fact, I have a few related ones.

I have a 2012 LR Freelander 2 and have attached a few pics of the headlamp unit. Last weekend both front bulbs (Sylvania) appear to have failed simultaneously! Leaving us in the dark at the front apart from the driving LEDs. Luckily, we didn't have far to go and there were streetlights.

The rear lights were OK at this stage. Putting the main beam on however then further caused the rear lights to go out!

On digging the units out and checking the bulbs, I discovered that yes, in fact both bulbs have by a great coincidence failed at the same time. I haven't yet managed to source any new ones yet. I wonder if fitting the new bulbs will also solve the other problems with the rear lights. And what would have happened if just one bulb had failed?

I am thinking of taking the vehicle abroad next summer and so while I was at it, investigated the tourist lever – except there doesn't appear to be one! I attach a copy of the handbook which seems to show one, though it may be that it's there for the Xenon bulbs only perhaps? Doesn't say so.

Anyway, if not, is there another adjuster for the halogen bulbs please?

Assuming that there isn't such a lever in my car, when I go abroad, what do I do? I assume I buy and affix a beam converter sticker somewhere, but where please? I vaguely remember reading somewhere years ago that the beams somehow adjust themselves automatically when abroad – but I don't buy that. If so, how do they know?

Pete Clarkson

A Starting with the tourist lever as mentioned in the Land Rover handbook. This does apply to the headlamps fitted with Xenon lamps on vehicles prior to 2013. On vehicles after this date the levers were fitted to headlamps with halogen bulbs and located on the grille side of the headlamp.

This would indicate that on your Land Rover Freelander a convertor unit such as the one at this website would be needed – https://bit.ly/CMGIUHL – the fitting guide number is also shown on the list of vehicles that can be downloaded from the page.

With regard to the lighting issues and the rear lights extinguishing when the headlamps are on. This could be related to a faulty bulb, and so I would certainly replace the bulbs first and then recheck. I am presuming that on turning the main beam lights off again the rear lamps once again operated as intended.

If this is the case, then it may be a relay or multifunction control module problem due to the faulty bulbs. Hopefully once replaced the lights will operate correctly, but if not, further diagnosis will be required.

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DAIHATSU ATARI 7

Brake calipers

Q My daughter has an older Daihatsu Atari 7 import which is in surprisingly good condition for its age. It has a clean MOT record, but her mechanic advised that one of the front brakes was sticking slightly and advised overhauling both the front calipers.
He sent them off to be refurbished but unfortunately, they have been lost in transit. He has been unable to locate any new ones as the vehicle started life abroad. Will the calipers from a later model fit?

Details of the car are: Date of first registration 01-10-2002, date of first registration in the UK, 01-03-2014, engine 1290cc, Chassis No S221G0013835.

Any help you can give would be welcome.

Roy Avery

A While your daughter's Daihatsu Atari 7 is closely related to the Toyota Sparky, and I believe the parts should be interchangeable. The availability of parts for the Toyota version is no more abundant than the Daihatsu version.

With the original calipers having been lost in transit, I suspect the best option would be to contact one of the companies who deal with the import of the vehicle and the parts from Japan, as I suspect this may be the best route to obtaining the replacement parts.

This company https://bit.ly/CMFZJcP has a request form on the site and may be able to supply either new or second-hand units for the vehicle, and this company https://bit.ly/CMFXBCa do have second-hand brake calipers for the Atari 7 in stock.

I suspect as this is an import model, these would be the best options to locate the needed parts.

HONDA ACCORD

Cat concern

Q The diagnostic scan of my 2010 Honda Accord says that the catalytic converter is at fault. I really should send you the scan. This all started when a check engine light lit up. A helpful guy in the auto store mentioned getting the cats cleaned is the cheaper way to go. I hope so because this sounds like a very expensive job for a car with 160k.

Ed Cahill

A To give a precise answer I would need to know the code that is present as this would give a more accurate reason for the problem. If the code is indicating that the post O_2 sensor is detecting the same readings as the input sensor, then this could indicate that the catalytic converter has failed and would need replacing.

Unlike a diesel particulate filter that can be cleaned out, the failure of the catalytic converter can be a more terminal condition. One product that can help is Cataclean and this can restore the catalytic converter under some circumstances. But as mentioned the full diagnostic results would be needed to give a more accurate opinion on the problem.

CATACLEAN
PETROL
8in1
THE COMPLETE FUEL & EXHAUST SYSTEM CLEANER

DAIHATSU SIRION

Limited speed

Q My wife has a 2009 Daihatsu Sirion 1.3 Auto. The problem we need your help is that it does not go above 30-40mph. When it is in D, it moves up to 2nd gear and then does rev up but not change the gear up.

This happens when it is under pressure speeding up or going uphill. When going downhill and there is no pressure on the engine, the gear shifts up to third. But that's all, it will hesitate where to sit (shifting between 2nd and revving up) the moment it needs power again. It has been serviced in November (including a gearbox fluid top-up) and had a weld/patch on the exhaust.

I have taken it to the garage that did the service, they did a scan and there was no error code.

Could you please help us?

Hakan Ozsoy

A As you did kindly provide the registration number, I can see that your wife's Sirion has covered just over the 100,000-mile mark.

You mention that the transmission oil has been topped up, but the service requirements on this transmission are that the oil should be replaced at 54,000-mile intervals. With this in mind I would as a first step, change the transmission oil and filter, and drop the transmission sump pan and clean the strainer.

The symptoms you describe do sound as though the internal oil pressure is low, and this would give the poor change under load that you have. When the oil is changed it can be checked and if this does have a burnt smell, then it may be the case that the clutch bands in the transmission are wearing.

This may require a gearbox rebuild but an oil change would be the first step. The transmission oil is Dexron III and the capacity is 5 litres, although for the oil change as all the oil will not be removable, the amount needed will be around 2.2 litres.

HONDA CR-V

Backplates

Q The brake backing plates for the rear wheels on my 2012 Honda CR-V have rusted through. I wish to replace these with new, however, genuine Honda plates are £143 approx. Would you know of a business, I would be able to purchase aftermarket plates from?

Also, would I be able to fit aftermarket piston seals to the brake calipers for a piston size of 39.2mm and where would I be able to purchase these please?

Lesley Marshall

A Unfortunately, after a search, I know of no company who can supply the brake backplates other than Honda. I suspect it is the case that this is a Honda only item and I have found second-hand backplates on eBay for £70.

This may be an option and I suspect the only way that you may be able to purchase replacement backplates at a more reasonable cost.

Piston seals are available from this company https://bit.ly/45KkfXz and they should be able to supply the needed parts. I would though advise that the pistons and cylinders are checked to ensure that they are smooth and in a good condition, as otherwise fitting new seals would not be advised.

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mazda

MAZDA3

Cutting-out diesel

Q I have a 2006 Mazda3 with the 1.6 Ford-based diesel engine. It's done just over 140,000 miles. It starts well and when it runs it's fine – I have, however, had a few problems.

This started a few months ago when the turbo blew. This has been replaced and several pints of oil removed from the intercooler and associated pipework. A few weeks later it started losing power on a trip out and eventually came to a halt. I called the AA they diagnosed a blocked DPF and suggested a forced regeneration. This was carried out and the car was fine for a while.

Unfortunately, it's now cutting-out occasionally. I think, although it's difficult to be sure, this is worse after a long trip and if it accelerates rapidly. At high revs (over 3500rpm) it seems to start running less evenly. I let the fuel run a bit low a couple of weeks ago – when this happened it started misfiring. I made it to the fuel station, filled it up and all appeared to be OK. It will sometimes restart immediately but sometimes it needs to rest for a while.

A couple of days ago it stalled on my drive and wouldn't restart. I called the AA and they diagnosed a fault with the fuel tank pump – they said no fuel was getting through to the filter.

I got them to move the car so I could get my other car out and said I would look at it the following day and if necessary, take it to my local garage. The next day I decided to check the obvious and see if there was an electrical fault with the pump. I checked the wiring – all appeared to be fine. The wires were intact, the connector was clean and there was electricity flowing. After I had done this, the engine started immediately so I'm assuming it's unlikely to be a failed pump – although it could occasionally be sticking.

I took it to my garage to get them to check it as I was running out of ideas. They said the glow plugs weren't working properly and this was preventing the DPF regenerating and as a result the DPF was choked. This may have caused the engine to shut down the pump. I was told when I bought the car that the glow plugs had been renewed recently. I have a Foxwell 644 Pro and have looked for codes but can't find any recorded.

Have you any ideas? It looks like a fuel supply problem, but I can't work out where the problem is and have had some varying opinions. I have a suspicion something obvious is being missed. Also is it worth having the DPF cleaned?

The reason I got the car was that I took pity on it as it was languishing on someone's drive, I'm wondering if this was a mistake!

Mark Winder

A My first comment would be that not only is it possible that the fuel pump could stop and then after a while restart, it is very likely. The fuel pumps on these vehicles are known to be problematic and I have changed quite a few myself over the years. The fact that the fuel ran low before the incident would also add to my suspicions that the pump may be failing.

Another possible cause of problems on your Mazda is the DPF generation system. This has a separate tank of fluid which is then pumped into the fuel tank during operation to assist in the regeneration process of the DPF. If this system is failing and the pump is not operating, then the regeneration process may not be fully functional, and this can result in a blocked DPF. I am unaware of the glow plugs being needed in the DPF regeneration process and I do not believe that this would be a factor in the cutting-out problem.

I would suspect that the damage to the DPF sustained by the oil expelled from the turbo may be the main cause of your problems and whilst a second forced regeneration may help clear the DPF it may need removing and cleaning through. It may also be a software error and if this has not been correctly reset when the DPF regeneration was carried out, then this will need to be addressed.

MAZDA6

Front windows

Q The front windows are not working properly on my 2008 Mazda6 Estate. I understand that I will need to take door cards off and do some diagnostics in order to pinpoint the cause of the problem (motor, mechanism, switch, etc), but where is the best source of replacement parts once I have identified the issue?

A web search doesn't seem to yield many options for my vehicle.

Ian Gabbott

A Before removing the door card to check the motor, etc, I would first carefully examine the wire in the loom between the door and the body – this is a common trouble-spot on many vehicles and with the door constantly opening and closing, this loom can fracture.

It is always a good starting point on any window or door lock related problems. It may also be worth checking the electric window relay which is positioned under the dash to the left of the steering column.

Having checked these points, if you then need to continue, you may find that the window regulator may be the source of the problem and will then need to renew it.

You then have a couple of choices, eBay can offer some bargains and the secret is to check the sellers feedback – too many negative ratings and I would steer clear. You could try a site such as this one who do have parts available for your Mazda http://bit.ly/CMcS4MA

Another option would be to find a second-hand part on a site such as www.247spares.co.uk or finally the main dealer should still be able to supply the needed parts for you – a full list of dealers is available at www.mazda.co.uk

MAZDA CX-5

Water damage

Q I have been a keen reader of this great magazine for some time now and often look back to the help you have offered me and countless others. Well Done to all. I wonder if you can guide me along with a problem on a 2016 Mazda CX-5 2.2?

I have done most of servicing and repairs myself on the cars that I have had over the decades and I'm reasonably OK with a multimeter. My neighbour asked me for advice regarding her Mazda CX-5 – the report is that whilst driving along a country lane during a very heavy down pour, rain water was being washed up onto the bonnet of the car due to deep pooling by the road side.

Then my neighbour had to swerve a little to avoid an oncoming car, I have been assured that there were no potholes or kerb mounting during this action. Shortly after this there were dashboard warning lights, "some amber ones and some red ones" was the description, and the car possibly in limp-mode?

The car pulled over at a safe place and the ignition key removed and then restarted about a minute later with no faults showing and the journey continued on without any problems.

However, from that moment on the car will now do the same fault light display on almost all journeys, same scenario, key

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MAZDA2

Eating batteries

Q I have an ongoing problem with my 2016 Mazda2 – it's eating batteries (I'm on the third). As we are both now retired, the car is only used once or twice a week, consequently the battery voltage goes from 12.6V to 11.0V in a matter of days. Note I have ensured all possible battery drains are switched off.

As a stopgap I put the car battery on charge with my CTEK MXS 7.0 when we are not using the car, the battery monitor shows a voltage of 13.24V after a day of charging, once it's turned off the battery voltage drops down to 11.8V in a day and a half.

My question is can I fit a remote battery switch such as the KTNNKG DC 12V 200Amp (from Amazon) without effecting the car's electronics when it's switched off, and what effects (if any) when switched back on and for how long.

Hope this isn't too much of a headache question for you to resolve. Thanking you in advance.

Martin Slaats

The KTNNKG DC 12V 200Amp battery switch unit.

A The answer will depend on if your Mazda has the battery conditioning monitor (which I suspect it does). If it does then the instructions from Mazda are that on models with a battery condition sensor the battery condition sensor multi-plug should be disconnected before the battery earth lead is disconnected, and when reconnecting, the battery condition sensor multi-plug should be fitted after the battery has been reconnected. This would possibly rule out the ability to use the battery isolator unit.

The full instructions for the Mazda2 fitted with Stop-Start are to:

- **Ensure the bonnet is fully open. Ensure the battery has been disconnected for at least five minutes.**
- **Connect battery and wait at least 10 seconds. Then connect the battery condition sensor multi-plug. Within one minute of connecting battery condition sensor multi-plug: Switch ignition ON.**
- **Wait at least 15 seconds. Press and hold Stop-Start system master switch for 10 seconds. Ensure Stop-Start system indicator lamp in the instrument panel flashes green.**

As you can see from the steps needed, simply isolating the battery would not enable the correct procedure to be followed.

Even with the low mileage you cover, the battery having been charged to 13.24 volts should not have dropped to the 11.8-volt level in such a short period of time, and I do suspect that something in the vehicle is draining the battery down.

This may be several things and this avenue may need to be explored. A test on the battery drain can be made by disconnecting the battery and using an amp meter, set between the battery terminal and battery post. The system does need to power down and so the reading should not be taken for around 30 minutes. The maximum reading you should see is 0.2 amps and anything higher than this is indicating a parasitic drain.

This should then be detected by pulling the fuses in turn to locate the area of the problem. The two most likely sources of a battery drain are: the audio system or the alternator – if pulling the fuses does not reveal the area of the drain, then the main lead should be removed from the alternator, if this then proves to be the source, then the most likely scenario is that the diode pack in the alternator has failed, and the current is leaking back past the diodes and draining the battery.

out for about a minute, then off again as if nothing has happened.

I have had my Thinkcar plugged in and this is what I'm seeing; U0401:68-08 INVALID DATA RECEIVED FROM ECM/PCM ACMDTS, U0401:00-08 same as above, U053B:83-0A INVALID DATA RECEIVED FROM FORWARD SENSING CAMERA, U053B:82-0A INVALID DATA RECEIVED FROM FORWARD SENSING CAMERA SNAPSHOT DATA, U0433:00-08 INVALID DATA RECEIVED FROM FRONT DISTANCE RANGE SENSOR.

Also, when this happens ABS fault, Smart Brake fault and I think cruise control is disabled by this?

I have looked at some forums on this but the results range from 'wash the windscreen' to Mazda dealers for a full camera re-calibration?

Have you come across this problem before and is there a home procedure to test/reset this above problem?

I suppose first thoughts are 'rain water' seeping in somewhere but before I start removing under panels and possibly front bumper to inspect the distancing sensor I would very much appreciate your thoughts on this please. I can clear the above faults but as soon as car is driven short distance they reappear.

Richard Fuisdale

A The codes you have retrieved do as you have indicated refer to invalid data being received and this is from the image processing module and the cruise control distance range sensor. These systems by default will prevent the correct operation of the cruise control and anti-lock braking systems.

The source of the problem could be water ingress into the loom or connecting plugs, and a first check may be to ensure that the multi-plug into the ABS module at the front offside of the vehicle has not been contaminated. If this module and connection is good, then the connections to the multifunction control module at the rear of the under-bonnet fusebox should also be checked.

If after these checks then nothing untoward has been found, then I would recommend that the system be re-calibrated. These systems are extremely sensitive, and the sensors can easily become de-adjusted.

The force of the water being pushed over the front of the vehicle has I suspect been the determining factor in the problem, but this may be due to its ingress in unwanted areas, or to the force of it as it pushed past the sensors.

The advice of cleaning the screen and the front of the vehicle is always a good first move, but I do suspect that this has already been covered. As the warning messages do clear after restarting, then calibration is a likely factor in the issue.

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MITSUBISHI SHOGUN

Engine noise

Q I need your expert advice on a metallic engine knocking noise on my 2015 Mitsubishi Shogun 3.2 SG3 with 62,500 miles and I also have an interior temperature query.

I appreciate noises are difficult to diagnose but I'm hoping you may recognise or suspect the culprit – I've attached one sound recording taken outside and one inside the vehicle. The clips can be heard at this link **https://bit.ly/CMDnrac**

The knocking only occurs when the engine is cold and once up to temperature there is no discernible knock. Some days it seems more pronounced than others, though I can't correlate it with the external temperature.

I took the car to the dealer (from whom I purchased the vehicle) twice regarding the knocking. On the first visit, the dealer replaced the engine oil and filter but no change. On the second visit, they sent to vehicle to the local Mitsubishi dealer who said it was a normal engine sound from these engines. I've also been using Millers Diesel Power ECOMAX for the last two tank-refills but again, no change.

Curiously, when I collected the vehicle from the dealer on the second visit, the noise didn't re-appear for two cold starts although the vehicle was not started for two weeks prior to my collection so no idea if they did anything else.

The vehicle starts and pulls well (although the idle is quite high at around 1000rpm, cold or hot) with no smoke from the exhaust whatsoever.

Also, once the engine gets warm enough, the cabin starts to warm up but gets excessively warm. I keep the automatic climate temperature at 19℃ yet have to lower it to 18 to maintain a comfortable interior temperature. The cold aircon air seems to start circulating if I drop the temperature to below 16° (lowest setting is 15° and highest 29°) once the interior is warm. Any ideas on this or is it normal for this vehicle?

Hugo Silva (Isle of Man)

A Thank you for the audio clips of the engine running. As you mention it is difficult to access an engine noise and even after hearing the clips, I could not distinguish any sounds that would be detrimental to the running of the engine.

As the engine does not suffer from any smoke when starting up I would discount the possibility of a knock occurring from the combustion of oil seeping down via the valve stems, and as we covered the problem that can occur with the timing chain tensioner in a previous email back in November 2021, I am presuming that this has been checked.

The valve adjustment is not carried out by hydraulic lifters, and so this would not cause any problem on cold start-up, that may have created a sound from an oil pressure problem not opening the lifters.

A diesel engine will be prone to sounding noisier on start-up and the noise is due to poor combustion caused by the low temperatures – and at the lower temperature the fuel atomisation will be less effective. This would concur with the possibility that the lower the outside temperature the worse the noise is.

Having had the engine checked out by Mitsubishi, then I would hope that you have no cause for concern.

The internal temperature of the cabin may be affected by the temperature sensor in the cabin heater, and this would need checking using Mitsubishi diagnostic equipment to ensure it is reading correctly.

The air-conditioning kicking in at under 16°, would be normal, and this should ensure that the cabin temperature is kept in line with the setting on the control, again this would be dependent on the sensor reading correctly.

MITSUBISHI SHOGUN

Emissions

Q My parents Mitsubishi Shogun Sport 2.5TD has just failed it's MOT on emissions. I have attached the results sheet. A couple of questions I have – it states engine temperature not taken but says it must be minimum of 60 degrees. How do they know it was 60 degrees minimum if not taken?

What are the opacity figures actually showing? The car is now 20-years-old and still appears to have its original catalytic converter, not been changed in the last 12 years of them owning it. I appreciate a good/regular service can help reduce emissions but is a new catalytic converter likely to make any difference?

The MOT centre said they have to test to the plate value on the car.

Matthew

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A With regard to the engine temperature, the garage should have ensured that the engine was up to temperature and would have checked the coolant temperature gauge before the test. The printout would give the information temperature not taken, if the machines probe was not used, but this does not indicate that the temperature was not checked by the tester at the time of the test.

The reading ACL.1-6 are the reading when the engine was revved and this is done six times, so the first reading ACL.1 would be the first sample taken and the other figures the consecutive readings.

The permitted reading is 3.00 m-1 according to the data I have from Autodata for this vehicle, and so from this information the vehicle should have passed. The sheet says readings test mode A and this from the detail it would normally have been test Mode B.

For vehicles first used before 1 July 2008, the maximum level is: 2.5m-1 for a non-turbocharged engine and 3.0m-1 for a turbocharged engine. This would be test mode B.

For vehicles first used between 1 July 2008 and 31 December 2013 the maximum level is 1.5m-1 for all engines. This would be test mode A.

But the MOT tester will abide by the test value on the plate and if this is lower, then this will be the figure that the vehicle is required to meet. In this case this is 1.7m-1, and so this is the figure your Mitsubishi needs to reach.

As on the sheet one of the reading did comply, I would hope that by the use of a product such as Cataclean and then ensuring the vehicle has a good run and is fully up to working temperature when presented for the re-test that the emission levels will comply with the requirements.

I can see from the MOT record that the vehicle has only covered just under 3000 miles since the last MOT and if the vehicle has been used in a sedately fashioned and mainly for shorter runs over the year, then I would be confident that a good run with the addition of the Cataclean additive would bring the emissions down.

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NISSAN ALMERA

Reverse gear selection

Q I have a problem with selecting reverse gear on my Almera. Having depressed the pedal to the floor, the selection is difficult and there is a pronounced grunt. There is no problem with forward gears, regardless of the throttle setting, which I would expect if the clutch was failing. Bearing in mind the shared hydraulic system, is it possible air has entered the circuit or that the slave cylinder needs replacing?

Austin Burgess

A Even though you have no problem with forward gear selection, the difficulty you have in selecting reverse may still mean the clutch is failing. The hydraulic system is only shared in respect that the clutch and brake systems use the same reservoir. As you have a separate external clutch slave cylinder, it would be worth checking this and the master cylinder for any signs of fluid leaking from the seals. Any damp patch around the seals will indicate a breach, which may be allowing both the loss of fluid and the ingress of air.

If the problem is with the hydraulics, pumping the clutch pedal two or three times before attempting to select gear should allow you to put the vehicle into reverse without the pronounced grunt. If no leaks can be found in the clutch hydraulic system, there may be wear in the clutch centre plate that is causing the clutch cover to require further travel before the clutch will release.

NISSAN MICRA

Rumbling on rough terrain

Q There is a problem with my wife's 2006 Nissan Micra K12, which we have owned from new and has now covered 70,000 miles. The only parts to be replaced have been tyres, rear wheel bearings and an O_2 sensor.

It drives fine on very smooth tarmac, but on a rougher surface it rumbles and rattles from the front – not a metallic rattle, I might add. I've had it up on axle stands and wheel ramps and poked and prodded with a pry bar and can't find anything loose and the front bearings spin fine. I would be almost certain that it was the front driver's shock absorber if it made the noise when I bounced the corner of the car, but it doesn't. Can a shock sometimes exhibit noise and rattle under load but be good enough to pass an MOT? It has had this noise for more than six months and passed its MOT a couple of weeks ago.

Nick Smeltzer

A It is possible for a shock absorber to emit a rumble or rattle under load, but quite happily pass the bounce test used on the MOT. The short up and down movements which occur in real road conditions can cause a quick reversal of direction in the damper, at which point the noise will be emitted. The noise may also be originating from the top mount, either due to wear at the point the strut meets the top mount or in the mount itself.

Another very common component to emit such a rattle is the anti-roll bar link arm. Often a quick shake will not show any movement, but a closer inspection will reveal a small amount of play between the balljoint and link arm. It is surprising how much noise can be emitted by this tiny amount of play.

There is also always a chance that the MOT tester overlooked a worn component, but as you have also checked the suspension components using a pry bar, I would be happy this is not the case.

NISSAN QASHQAI

Flywheel

Q Can you tell me does my Nissan Qashqai 2009 1.6 petrol Mk1 have a solid or dual mass flywheel? I can hear and feel a thump when changing gear, mostly first and second gear. The car drives fine and the clutch feels and behaves as normal. I would appreciate your thoughts on this.

John Francis

A From the data I have on your Nissan this has a solid flywheel and not the DMF. The noise you describe does sound more of a drivetrain noise than that which would be associated with a failing DMF, these often give a rattling/knocking on tick-over and when revving the engine slightly while stationary. I would check the security of the engine mounts and the stabiliser bar on the engine.

Another possible source of the noise is one pointed out to me by Autodata which notes that the rear of front subframe can make contact with the subframe reinforcement crossmember, causing the knocking noise.

To rectify this, the subframe reinforcement crossmember bolts should be slackened and the subframe reinforcement crossmember should be repositioned. Ensuring 2-4mm clearance between front subframe and subframe reinforcement crossmember. The subframe reinforcement crossmember bolts should then be retightened.

NISSAN MICRA

Windscreen wiper

Q My wife's Nissan Micra K12 rear windscreen wiper, when switched on, goes for about 2.5 sweeps, and then stops with the blade halfway across the screen.

If you switch it off then on again then nothing happens I find that you have to leave it off for 3-4 minutes before it goes for another 2.5 sweeps and when you use the rear wash/wipe the same happens.

I have been trying to find a relay unit to replace but cannot find one. Can you please advise where the relay might be and if this might the cure for the problem?

Graeme Home

A There are a few possible problems that can cause the symptoms you have. The first point I would check is that the wiring loom between the tailgate and the body is in good condition. The fault may be a result of a poor connection caused by a broken wire. This could be either the earth connection or a live feed.

If no problems are found within the loom between the door and the body, then the wiper motor itself may be the problem. A failing motor or tight spindle could also cause the same symptoms you have.

Your Micra does not have a relay for the rear wash/wipe system, and uses the body control module to regulate the rear wiper operation. The body control module is fitted up behind the centre of the dash. Although it is possible that the body control module is causing your problems, I would suspect that it is more likely that one of the previous suggestions is a more likely cause.

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NISSAN NAVARA

MOT failure

Q My son-in-law owns a 2016 Nissan Navara 2.3 dCi which has been off road (sat in our local Volvo garage on Anglesey) for the last two weeks due to an MOT failure. The failure is due to the rear fog light not working – a simple problem or so we thought. According to the Volvo garage the fog light receives an input but there is no output and as they do not have an electrical circuit drawing of the system. They can't trace the problem and therefore can't repair the fault!

Our local Volvo garage and my son-in-law have been in contact with the nearest Nissan dealer who is based in Chester (90 miles away), and they have refused point blank to supply a copy of the required wiring diagram or give us any assistance whatsoever. All they say is bring it to us to sort out! Any help/assistance you can give us would be much appreciated.

John Griffiths

A Unfortunately, this is the type of information that is becoming increasingly difficult to obtain and at the present time even Autodata have no wiring details on the D23 Navara. It appears that Nissan are reluctant to release such information, although it will in time become accessible. The details I do have indicate that the Navara should have LED type rear lamp clusters, and if there is a feed in (input) then it would suggest that the LED unit may be at fault. If this is not the case, then it should be quite a simple procedure to check the earth circuit.

It could be the case that the Volvo dealer do not have the skills needed in this case and the services of an auto electrician if one is available in your area, may be a better solution.

I later received a follow up email informing me the car was now sorted and back on the road.

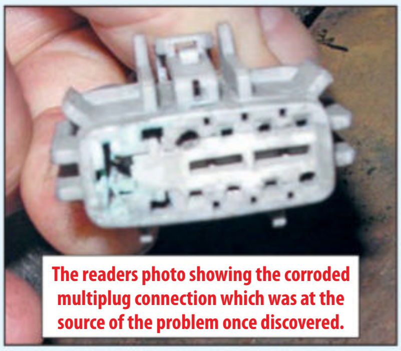
We picked up the car from the Volvo garage and took it to my mate's garage where his auto electrician started his investigations. The first thing he found was, as you predicted, a CAN-bus system but with an incandescent single filament bulb. He then interrogated the Body Control Module under the bonnet to see if the command it gave to the rear fog lamp was constant and found it was instantaneously switching between ON and OFF, which indicated that the lamp was not being illuminated, ie. the circuit was not complete.

We then carried out the following search on the internet and received three hits – and all three said 'tow bar electrics' and 'built-in fog light cut-out' were the cause of their problems.

My son-in-law's car does not have a fitted towbar or associated electrics – but when we looked underneath we could tell that a towbar had been fitted previously as we could see the witness marks on the chassis and the in-built female multi-plug with nine multi-coloured wires (part of the loom) which the towbar's male electric multi-plug socket would have been linked to, was hanging down off the chassis – and all nine of its female connections were in view and covered in green verdigris.

With the car running and the rear fog light switch in the dash 'ON', the electrician checked all the nine connectors in turn of the in-built female multi-plug and then diagnosed that the in-built female multi-plug should have been capped with a matching male multi-plug which was equipped with a loop to form an electrical circuit between the Pink and Green wires, which would then provide the power to operate the rear fog light.

As we didn't have a suitable male multi-plug connector with the required loop, he decided to cut the Pink and Green wires which entered the back of the female multi-plug and then joined them together to form the required loop (this is a temporary measure until we receive the correct male plug). When tested the fog lamp worked perfectly. The auto electrician had taken a little over an hour to diagnose and then sort out the problem.


The readers photo showing the corroded multiplug connection which was at the source of the problem once discovered.

The next day (24 hours after we had picked up the car from the Volvo storage compound in which it had been for the previous 20 days following their failed attempts at sorting out the problem), my son-in-law contacted Volvo and said that the cars fog lamp was now working and could they please finish the MOT inspection. Their unexpected reply was that the car had to be fully MOT'd again (at a reduced price) but they could not do it for another seven days!

Whatever is happened to businesses providing above-and-beyond-customer care and service? Needless to say, we won't be using this garage's services anymore!

When I was informed of the above, I immediately contacted my mate's garage and he then arranged for the car to be MOT'd at his preferred MOT centre that afternoon and it passed with flying colours (no fails and no advisories).

Interestingly, this is the third MOT that this Nissan has had since my son-in-law purchased it and this fault has only now been picked up!

John Griffiths

TOYOTA PRIUS

Hybrid batteries

Q I had a minor accident almost one year ago. I caught the curb of an island and blew both offside tyres and there was also some damaged bodywork.

It is a Motability car and has taken this long to get a repairer and then the parts. It is now due an MOT and service. We were due to change it but due to the new car situation we are still waiting for a build date for our new car.

The question is, being a Hybrid will the Hybrid batteries need replacing or will they recharge once the car is started? I know it's first journey is to the Toyota dealership to get its MOT. What a palaver this has been we are still waiting for the repairers to finish it.

Duncan Rathbone

A The hybrid traction batteries, although they will have depleted over the long period of standing, will once the vehicle begins to be used should return to a full charge state. Unlike the lead acid type batteries that can calcify when unused for an extended period, the Nickle-based batteries in the hybrid system will return to a fully usable state, although this may take a short amount of use. I suggest you give the Prius a good 30-40 mile run.

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TOYOTA AYGO

Central locking

Q My granddaughter has just purchased a 55-plate Toyota Aygo and the central locking works using the key in the door lock but the remote is not working, I have changed the battery yet it's still not working. Can you please tell me the procedure for reprogramming the remote to the car? Thanks in advance for your help.

Craig Christie

A Presuming the key is working OK, the synchronisation method is as follows:

- **Switch the ignition off, then switch the ignition on (do not start the engine). Press and hold the lock button on the key for approximately 10 seconds.**
- **Switch the ignition off and remove key from the ignition switch. The synchronisation procedure is now complete. Confirm synchronisation has been successful by locking and unlocking vehicle.**

If this does not work, then the key may need reprogramming, this can be done as follows:

- **Switch the ignition off and open the driver's door. Switch the ignition on and then off, within 40 seconds close and open the driver's door twice.**
- **Switch the ignition on and off and then within 40 seconds, close and open the driver's door twice. Close the driver's door. Press driver's door lock button to lock all doors.**

Then within 40 seconds:

- **Switch the ignition on and off once to program a new key code whilst retaining the original codes or twice to program a new key code whilst erasing the original codes.**
- **Lift driver's door lock button to unlock all doors.**
- **System should now lock and unlock vehicle, once or twice depending which mode has been selected.**
- **Remove key. Then carry out the following button procedure within 40 seconds: Simultaneously press and hold key lock and unlock buttons for 1-1.5 seconds. The within 3 seconds: Press key lock or unlock button for a minimum of 1 second and release.**
- **System should now lock and unlock.**
- **To exit programming mode: Open driver's door.**

If no joy, there may be a problem with the key or the vehicle, in which case diagnostic equipment will be needed.

TOYOTA COROLLA

ABS problems

Q In need of your advice once again please with our 2006 Toyota Corolla HB 1.6 VVTi (engine code 3ZZFE). Just starting recently, when coming to a slow stop it feels like the ABS is being activated on a wheel for just a second, it even happens when reversing.

It has not generated any fault code (very old simple reader) and checking all four wheels for bearing play, brakes and suspension cannot find anything wrong. Had found some static resistance values on the web for the front and rear sensors and they all seem nominal, eg. both fronts 1.47k and both rears 1.14k.

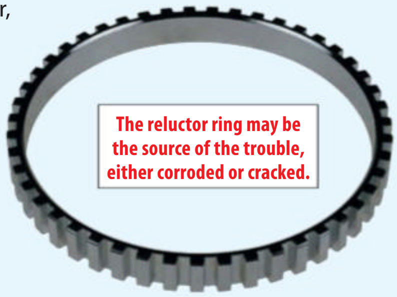
The front reluctor rings appeared cleanish and a blast of brake cleaner left them looking sparkling and the Bosch sensor tips looked OK.

Noticed in the May edition you advised a Hyundai owner to check with an ammeter at the ABS unit the current from their suspect sensor, so wondered if you had any info on a similar test for our Corolla?

For the price had thought about changing both front sensors, though from the YouTube videos the rears seem to be so difficult it's better to replace the axle complete with the new sensor!

My first choice for new front sensors would have been Blue Print but one of them is out of stock and the suppliers do not have any restocking date, though they do have other makes like Lemark, Kerr, Nelson, InterMotor, but have no idea how good they are, can you recommend?

Will Petch



The reluctor ring may be the source of the trouble, either corroded or cracked.

A I would normally expect that if the problem is the ABS wheel speed sensor, that the ABS light would illuminate when the problem occurred. It is difficult without feeling the problem that you have to fully access the situation, but it would be more likely that a reluctor ring would give this type of symptom.

As you have checked the reluctor rings and these do appear to be clean, I would also ensure that they are secure, it is possible for a reluctor ring to move and this can give the same results as you have.

Having checked the resistance values and found them even, then I would conclude that the sensors are working as required.

One check that would be more conclusive would be to use a more detailed scanner with a live data setting, this would enable the live data from the sensors to be checked whilst driving, and when the problems is occurring. This would give a greater insight into to area of the problem, and this will allow you to concentrate on that area.

This may be a circuit problem or a problem with the ABS module. It could also be a hydraulic issue, and this could all be confirmed using a scanner with live data.

This would be a better option that replacing the sensors at this stage as having checked the readings, replacement of the sensors may not resolve the issue.

TOYOTA YARIS

Non starting

Q My brother has a 2004 Toyota Yaris in Barnsley, at his original home about 30 miles away from me. Unfortunately, he is now resident in a care home and is unlikely to drive again, although he seems to think there may be a slight chance.

The one-owner car has been serviced and MOT'd annually. It had a new battery last year as a precaution as it was still on the original battery, and has covered around 60,000 miles since new.

To my knowledge it is very dependable and has never let him down.

It has been standing for months, and I have visited, and started it, usually on the first turn of the key, every three weeks or so. Because I was away, my brother managed to visit himself, collect documents from the house, etc, and tried to start car. He found that he could not enter from driver's door (apparently electric locking would not unlock) but managed to enter from passenger door. He found

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that it was completely dead, the instrument panel gauges would not even light up.

I have promised that I will visit to charge battery for a few hours.

I suspect that there may be a fault with the electric locking system which may have completely discharged the battery. He told me that the boot does not always lock properly, and I did find some time ago that even though it cannot be opened, it needed a good push to get it on a second latch to make it secure. I did wonder if the boot light was remaining on when the boot lid was not shut securely?

Finally, if I disconnected the battery altogether to bring it home for a long charge, other than the radio which I think would need retuning, is there anything else that would not reset when the fully charged battery was reconnected?

Unfortunately, the car is not in a position where I can connect it to my own to jump-start it. Are there any known problems on this model which would discharge the battery?

Any suggestions and help would be greatly appreciated.

John Seymour

A **I suspect that you are correct in thinking that the boot not closing fully has allowed the boot light to remain on and discharge the battery. This is a common problem and one which has most likely caused the battery to drain. There are of course other reasons which may have caused this, but I suspect that once the battery is charged the vehicle should start without issue, and at that point any problems can be addressed.**

The only resetting that may be required after the battery has been refitted is the one touch operation of the windows and/or sunroof if the vehicle is fitted with these. This is easily carried out as follows:

- **Switch the ignition on and when the driver's window switch warning lamp flashes: Press and hold window open switch to fully open window. Continue to hold the switch for at least 1 second after the window is fully opened. Then immediately lift and hold window close switch to fully close window and continue to hold the switch for at least one second after the window is closed. Release switch. Ensure window opens fully and fully closes, then switch off the ignition.**

Other than the window operation as listed above and possibly as you have mentioned the radio, no other re-coding will be needed, and hopefully after a good reconditioning charge, the battery will be serviceable again.

Once refitted it would be good to check for any drains on the system including the interior and boot lights.

TOYOTA COROLLA

Reversing sensors

Q I bought a 2004 Toyota Corolla 1.6 VVTi T-Spirit hatchback in 2011.

I do all the maintenance on it where I can. Soon after I bought the car, I had reversing sensors fitted at my local Toyota main dealer. These have been working fine until recently when I found that they didn't work. I did have water build up on the front passenger side. I traced this to blocked sunroof drains, which I cleared. The reversing lights still work, so I'm wondering where the sensors get their power from. Could it be a blown fuse? Please help!

John Thurgood

A **From the details I have the Toyota reversing sensors should be powered from the reversing light circuit. As the reversing lights still work the problem may be either in the take-off connection which should be in the luggage compartment or with any separate power circuit they may depend on. This could vary with the reversing sensor system they used but this may be fused separately and could be powered from one of the spare fuse locations in the fusebox.**

The approach to take would be to first find the control unit, which should be located in the boot and connected to the rear sensors. Physically checking the fusebox it should be able to determine the wiring as most normally have an external diagram showing the connections. These will consist of the sensors, a positive feed and a negative to earth. There may also be a connection to the front sounder and possibly a trigger wire from the reversing circuit.

It will then be possible to check the feed to the unit and to see if this is powered when the reversing lights are operated. If the earth is good and the box is powered up, it may be the case that the reversing sensor unit itself has failed. It could also be possible that if one of the sensors has shorted out, this is preventing the box from working.

Hopefully after taking these steps, you should be able to discover the source of the problem.

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If you have a problem vehicle, *Car Mechanics* has the answer in the shape of our technical editor STEVE ROTHWELL. Contact Steve, as detailed below, for FREE advice on all car-related problems. Please help Steve to help you by giving as much information on the symptoms as you can – including the VEHICLE REGISTRATION NUMBER.

As *Help!* is a free service, some complex questions may require more time and resources than we can reasonably allow – when this is the case we will let you know.

Steve will reply to all queries as quickly as possible, but please allow up to 28 days for a reply. Difficult/complex questions or those requiring research may take a little longer – please be patient.

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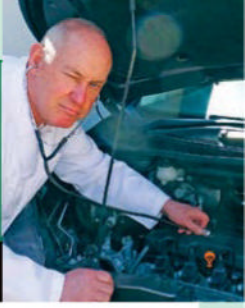
Diagnostics Doctor

Steve Rothwell answering your **ENGINE MANAGEMENT** queries



GENERAL

Electronic Parking Brake

Foxwell
AutoMaster Pro
F1
F2
F3

Q Will the Foxwell NT 680 diagnostic scanner, allow me to do the rear brakes, resetting the Electronic Parking Brake (EPB) on a 2012 Hyundai i40 and on a 2019 Ford Mondeo?
John Hester

A The Foxwell NT680 Pro ALL Systems Scan Tool, Product Code: FXNT680P, does cover the EPB on both the Hyundai and the Ford models. This should be perfectly capable of operating the system to allow the brake pad and service operations as required.

The Ford can be put into service mode without the need for the diagnostic equipment as follows:

- **Switch ignition on without starting the engine, then depress and hold down the accelerator pedal. Whilst still holding the accelerator pedal press and hold the electric parking brake switch. Switch the ignition off and then on again within five seconds.**
- **Wait until the warning lamps in the instrument panel illuminate (warning messages may be displayed in the multifunction display). Then switch the ignition off and release the accelerator pedal, then the EPB switch. The parking brake is now in service mode and the rear brakes can be worked on.**

To take the system out of the service mode after the work is complete the following steps need to be carried out:

- **Switch the ignition on and depress and hold down the accelerator pedal, pull and hold the EPB switch. Switch the ignition off and then on again within five seconds. Wait until the warning lamps in the instrument panel extinguish, then release the accelerator pedal and then the EPB switch. Switch off the ignition. The system is now reset.**

Whilst work can be carried out on the Hyundai rear brakes by disconnecting the EPB actuator multi-plug, the parking brake system will need to be reset afterwards using the suitable diagnostic equipment.

FORD FIESTA

Orange light

Q I have a 2017 Ford Fiesta 1.0 EcoBoost with 22,687 miles. It is serviced every 12 months on the dot. I have just taken it for its MOT which it passed with no problems, but the examiner asked if I knew that the orange light was on the dash. I didn't, as it was not on when I drove there, and it has never failed to extinguish once the engine is started. I must stress the examiner is my regular, extremely trusted guy so I am in no way accusing him of putting the fault on. He read the fault code as O_2 sensor and reset it to see how I got on.

Less than a mile later and the EML was on again, So back at home I read the code as P0141 O2 SENSOR HEATER CIRCUIT BANK1 SENSOR 1.

My code reader is a dedicated BMW reader, but it covers basics on other cars. Reading DATA STREAM, O_2 sensor output voltage B1-S2 shows a constant 1.275 volts. O_2 sensor current B1-S1 is flickering slightly but hovers around 0.04mA. It does say mA, not 0.04 amp.

I reset the code, but it came back on a few minutes later whilst I was checking the FCR and the engine ticking over. I reset it again and drove a couple of miles around the block and the EML has not emerged yet.

I have no experience in reading FCRs, but does this information help explain the problem at all, or am I looking in the wrong area? I can see two sensors on the front of the engine. Can I assume the upper one is sensor 1 and the sensor about 12 inches underneath is sensor 2?

I can see the cable on the sensor end looks fixed. If you suggest checking connections, where do the other ends of the cable terminate?

I will be very grateful for any suggestions you may have.
Melvyn Allen

A You have explained the problem well and I do have an understanding of the position. The sensor 1 is the sensor prior to the catalytic converter and sensor 2 is the sensor after the catalytic converter. As the engine in your Fiesta has only one bank, the position will also be recorded as bank one.

The code P0141 does indicate that the Heated Oxygen sensor (HO2S) 2, bank 1, heater control circuit has a malfunction. This may be due to connection error or due to the circuit for the heater within the O_2 sensor. This is not the O_2 sensor circuit

I suspect that EML light must have come on after the MOT as this would otherwise be a failure point.

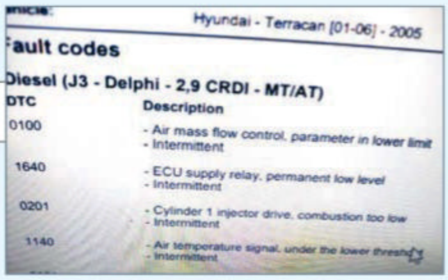
There is a test that can be done of the heater circuit in the O_2 sensor, and this is to use an ohm meter between Terminals 1 and 2 – these are the White/Orange and the Green/Blue wires. The ohm meter should read 3-4 Ω.

If this reading is correct, then the fault is most likely in the loom between the ECU and the O_2 sensor. From the diagram I have from Ford, the connecting plugs for both the O_2 sensor are located at the back-side of the engine towards the bulkhead with the loom travelling from the exhaust manifold/cat on the front-side around the top of the gearbox bellhousing to the backside where the connecting plugs are located.

Having located the plug, if the O_2 sensor does appear to be operating correctly then a test can also be made on the continuity of the loom, and I would also check the connections to the ECU to ensure that a poor circuit in this area is not the cause.

HYUNDAI TERRACAN

Rough running



hicle: Hyundai - Terracan [01-06] - 2005

ault codes

Diesel (J3 - Delphi - 2,9 CRDI - MT/AT)

DTC	Description
0100	- Air mass flow control, parameter in lower limit - Intermittent
1640	- ECU supply relay, permanent low level - Intermittent
0201	- Cylinder 1 injector drive, combustion too low - Intermittent
1140	- Air temperature signal, under the lower thresh - Intermittent

The screenshot taken by the reader showing the codes that were read.

Q I've had my 2006 Hyundai Terracan 2.9 CRDi, common-rail diesel since new. It has now covered 80k miles. Regular servicing according to Hyundai specs. Fuel filter and oil changed 2k miles ago. Other issues but no engine problems until last week. The symptoms are rough running, unsettled chugging idle (should be 850rpm, it now varies between 850 and 1000rpm), quite weak acceleration, particularly uphill.

The above occur only when the engine is fully warm. When the engine is cold, starting is instant, idling and acceleration are as they were before these issues. Starting is not an issue when hot. When idling, disconnecting the MAF sensor makes no difference to the symptoms. Multimeter testing the MAF sensor, engine off ignition on, shows no 12V power – in fact, no electrical signal on any of the five pins. Interestingly, the code 101 suggesting a MAF problem popped up last year, but I ignored it as the engine ran fine and it was the only code. Yesterday, I removed the air filter, and it was caked with dust (this is a particular dusty environment), noticeably dirty. I replaced it with a new filter. Test drive gave the same results – fine until engine is warm then the lumpy symptoms, etc. Today I ran a diagnostic test, the results are attached.

I have not yet removed/deleted the codes from the ECU. Thank you for your time.

Tony Howard

A The codes showing on the scanner all have one common denominator and that is a circuit malfunction. The codes translate as on the scanner as follows:

- **0100: Mass air flow (MAF) sensor/volume air flow (VAF) sensor - circuit malfunction.**
- **1640: Engine control (EC) relay - circuit malfunction.**
- **0201: Injector 1 - circuit malfunction.**
- **1140: Intake air temperature (IAT) sensor - circuit malfunction.**

The exception is the final code which is 0101: Mass air flow (MAF) sensor/volume air flow (VAF) sensor - range/performance problem, this is showing a possible fault within the MAF sensor.

To ensure that these codes are all still present, I would recommend first clearing them and then rechecking to see if they all return.

If they do return, then the inspection of the engine loom and engine control unit multi-plug would be the first step in order to look for any circuit malfunction that could cause these multiple codes.

If the codes do not return, other than the 0101 code, then I would suspect that the MAF sensor may be the source of the problems. This does also incorporate the air intake temperature sensor and if this is faulty it would also account for the reason the problem is only apparent with a warm engine.

It may be possible to check the accuracy of the air intake temperature sensor using your scanner.

The method of testing the feed to the MAF is to disconnect the plug and use a voltmeter between pin 2 and earth with the ignition on. This should show a voltage of 4.8-5.1 volts, the voltmeter placed between pin 4 and earth should show battery voltage. The pins are numbered 1-5 right-to-left with the connecting tang upwards.

If this is not the case then a fault in the circuit at the engine control module, or in the loom may be present.

The resistance of the MAF sensor can be checked using an ohm meter between terminal 1 and earth. This should read infinite with no resistance.

The internal circuit of the MAF sensor can be further tested by placing a voltmeter between terminals 2 and 3 – the voltmeter should read below 200mV.

Hopefully using the above procedures should reveal the source of the problem.

LAND ROVER DISCOVERY

Fault codes

Q Grateful for any assistance you can provide which will help clarify the cause of the following codes which trigger an EML on my 2016 Land Rover Discovery Sport 2.0.

U05AA-86 Intermittent - Invalid data sent from Charge Air Cooler (CAC) coolant pump
P2047-13 Intermittent - Reduced injector circuit open (bank1 unit 1).

I'm picking up the codes using my Autel Maxipro and can clear the codes for a couple of weeks before they both return. Once the EML is actuated there does not appear to be any loss of performance or running issues. The car has been regularly serviced from new and the engine oil changed annually with AdBlue levels being maintained.

I'm assuming the two codes are not linked although the fact both reappear at the same time probably suggests I'm wrong!

Howard Lydney

A The first code U05AA-86 is as you have said, referring to Invalid data received from charge air cooler coolant pump motor. The second code is referring to the Supercharger (SC) bypass valve B and is indicting a circuit malfunction.

This does give the two codes a common denominator of a poor circuit or a connection fault. With this in mind the first checks should be to ensure the integrity of the engine loom, making close attention to the connections in the area of the turbocharger vane actuator and the secondary coolant pump.

LAND-ROVER
DISCOVERY
RCC 361

The fault may be due to either of the mentioned components (vein actuator or coolant pump motor) drawing an excess load when operating, but for the two faults to show up at the same time, I would suspect a circuit fault more likely.

If no external problems can be seen then checking the engine control module multi-plug, would be advisable to ensure that a poor connection is not present on one or more of the terminals. This could also be the source of the codes.

SKODA OCTAVIA

Fault codes

Q I have a 2011 Skoda Octavia 1.8 TSI Mk2 with a fault code showing 0-9% Elect Control System. Could you please tell me what this fault is and how to fix it?

The code that was read is 01134 active/static alarm horn (h12.sporadic 004-no signal/communication). And 03156 passive/occasional anti-theft alarm system sensor-sporadic 004-no signal communication.

John Luke

A The code 01134 is referring to the alarm horn (H12): No signal/communication, and this can cause a number of problems including the alarm being triggered. One of the common faults that can cause this code is a poor connection at the wiring or connector to the horn unit, or it can be due to the unit itself having failed internally.

The code 03156 is referring to the anti-theft alarm sensor (G578) and this shares the electrical system with the alarm horn (H12) back to the vehicles electrical control module (J519). With this in mind, the fault will be either the horn or the connection between the units. The module J519 is the unit located below the dash which is integrated with the interior fuse/relay panel.

I would start by checking the connections and cleaning the connection plugs using an electrical contact cleaning spray. Once this is done the codes should be cleared and then checked to see if they return.

If they do return, then I would expect the problem to be the horn unit (H12) located behind the offside wheelarch, but a good check of the wiring and connections would be advisable first.

VAUXHALL CORSA

No codes

Q I recently had a customer come to the garage with a 65-plate Vauxhall Corsa CDTi (1.3 Diesel). When we diagnosed the car which had its engine management light on, it showed a fault with the post-DPF exhaust temp sender (Exhaust Gas Temp Sender-post DPF-2), and on checking the actual temp read out it was clear that there was no reading from this sensor. We replaced it, did a chemical DPF clean and regen.

The vehicle went for MOT and passed the emission's test as a 'fast pass', really good on emissions. After a few days of use, the customer reported a warning on the dash 'Reduced engine power' ... Service required.

We looked at the Corsa again and it shows no fault codes in the ECU (we tried several diagnostic tools like TOPDON ArtiDiag800 BT and Delphi).

If we reset the non-existent codes, the vehicle drives fine for anything between one hour and a day or so.

Keith

A With the actual code number, I would be able to make a more defined diagnosis, as the description of the code Exhaust Gas Temp Sender-post DPF-2, could translate into several codes, and the precise code would give an indication as to whether this was an electrical circuit fault and if so the nature of the fault or a possible a reading correlation problem.

As the system does appear to reset what would appear to be an invisible code, this could possibly be a hexadecimal manufactures code that is remaining in the system and is not translatable into the standard EOBD code system allowing the units you have used to read it fully.

In many cases where the engine management light is on and a code does not appear to be present, the source of the problem is normally either a communication issue between the ECU and the EOBD port, an earth problem with either the EOBD port or the ECU, or the fact that the code present is a manufacturers specific code which does not translate, and can only be seen using manufactures software. If this is the case, the EOBD compliance does not ensure that all the codes in the system can be read using standard equipment.

I would start by ensuring that the communication between the ECU and the EOBD port is good, removing and checking the condition of the terminals on the ECU. I would also ensure that the continuity to the earth connections is good.

If nothing is shown to be a trouble spot after these checks, then I would consider that either the new sensor fitted is faulty, the ECU needs to be tested, or this is a problem that will require the Vauxhall diagnostics system to fully resolve.

Diagnostics Doctor

Diagnostics Doctor is a **FREE** helpline service for *CM* readers – including trade readers – who are struggling with diagnostic/engine management related faults.

Steve Rothwell will answer all your queries. He will need as much detail as possible: **MAKE, MODEL, YEAR, ENGINE CODE** and **NUMBERPLATE** of your vehicle – and the type of management system installed. Obviously, Steve will not be able to assess the vehicle up close, so his answer will be on the basis solely of your description. This is a FREE service and it may take some time to respond to certain problems. If you would like to receive a personal response via post, please enclose an SAE.

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Common abbreviations

ATS	Air Temperature Sensor
AFM	Air-Flow Meter – not a MAF type (see below). It could be, for example, a vane type
CAS	Crank Angle Sensor
CPS	Crank Position Sensor
CTS	Coolant Temperature Sensor
ECT	Engine Coolant Temperature
ECM	Electronic Control Module
ECU	Electronic Control Unit
EGR	Exhaust Gas Recirculation – meters exhaust gas back to the intake manifold
EML	Engine Management Light
EMS	Engine Management System
EPC	Electronic Power Control
FCR	Fault Code Reader
HT	High Tension – ignition output to the spark plugs
IAV	Idle Air Valve
ISCV	Idle Speed Control Valve – usually operated by a motor controlled by the ECU
LOS	Limited Operating Strategy – if the ECU detects a malfunction, it runs a programme to allow the car to still go, but at reduced efficiency
MAF	Mass Air-Flow meter
MAP	Manifold Air Pressure
MIL	Malfunction Indicator Lamp
PCV	Positive Crankcase Ventilation – takes crankcase gases and recycles back to the inlet system
TBPS	Turbo Boost Pressure Sensor – used by the ECU to regulate turbo output
TPS	Throttle Position Sensor
VSS	Vehicle Speed Sensor
WOT	Wide Open Throttle

Electronic Diagnostics

Vauxhall Vivaro 1.6 Diesel

Tracing and fixing faults in electronic engine management systems

Rob Hawkins discovers many of the potential problems that can arise on the diesel-engined Vauxhall Vivaro when he inspects one at AES near York.

"The faults are often multi-layered and interlinked," explains Mark Shipman as we investigate the engine bay of a 2017 second-generation Vauxhall Vivaro (manufactured between 2014 and 2019). Many of those problems affect the diesel particulate filter (DPF), which can result in its failure, but that's often only the tip of the iceberg.

Surprisingly, the 1598cc common-rail diesel engine that powers the second generation of the Vivaro (known as the Vivaro B and developed on the back of the Renault Trafic) is more reliable when fitted to several Vauxhall saloons. Mark Shipman at AES suspects the engine is possibly over-stressed in the van, especially if it carries heavy loads and only covers short journeys. With an unladen weight of 1725kg and a recommended maximum of 2800kg, that's a lot for a small engine. Plus, it probably doesn't help to have such a long service interval between engine oil changes – every two years or 25,000 miles!

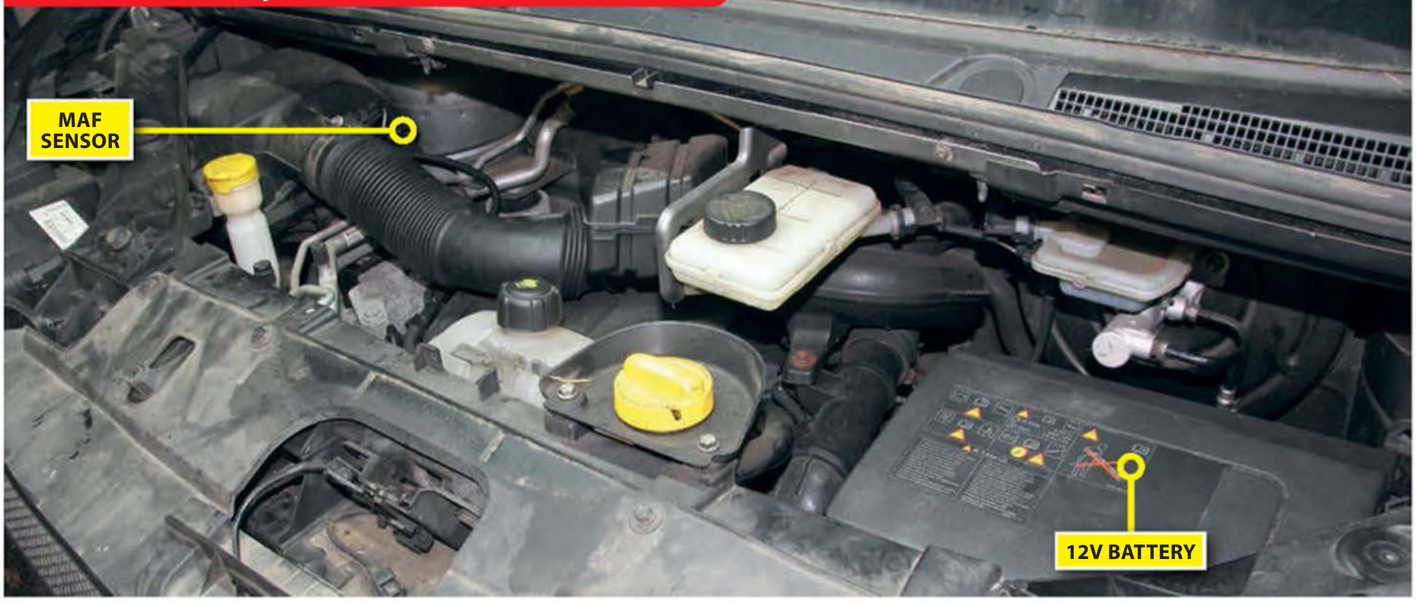
Those long intervals between oil changes appear to add to the potential problems that can arise (such as dilution), which is often a result of the DPF attempting to regenerate. Diluted oil adds further issues for any components that require lubrication, such as the timing chain, but also the moving components and their bearings inside the engine.

We're not trying to say that all Vauxhall Vivaros with a 1598cc diesel engine are problematic, and there are numerous owners out there who haven't had any of the problems we've outlined.

TYPICAL FAULTS

❶ OIL DILUTION
❷ BLOCKED EXHAUST PRESSURE SENSOR
❸ FORCED DPF REGEN
❹ STICKING EGR VALVES
❺ INDUCTION & EGR SOOT
❻ GLOW PLUG FAILURE
❼ STICKING THERMOSTAT

1598cc 4-cylinder turbodiesel



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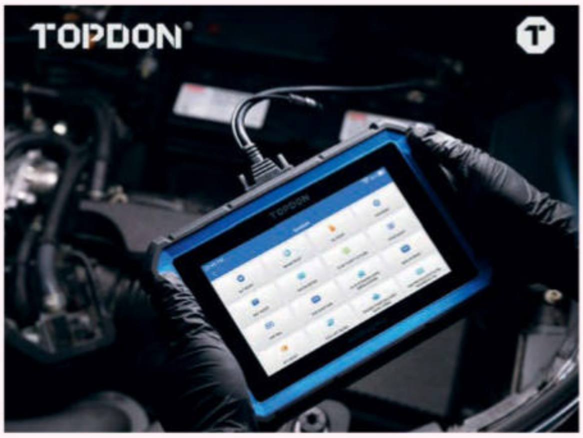

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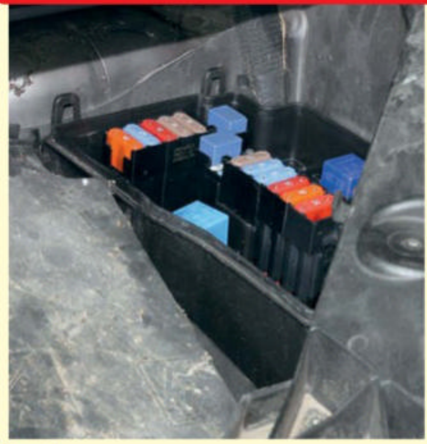
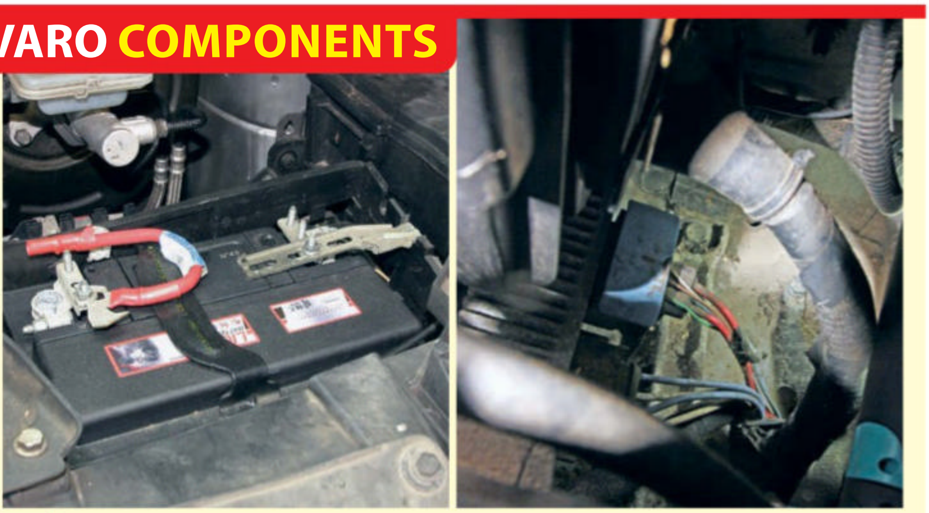
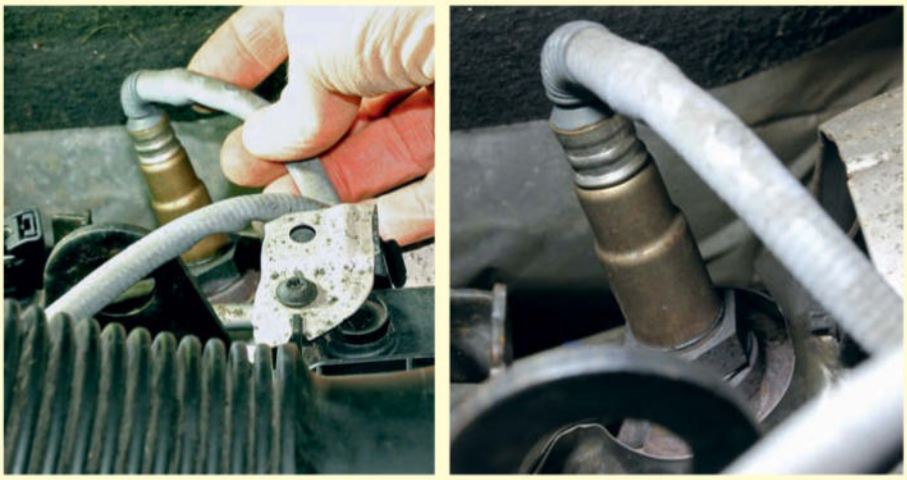
Typical VAUXHALL VIVARO COMPONENTS



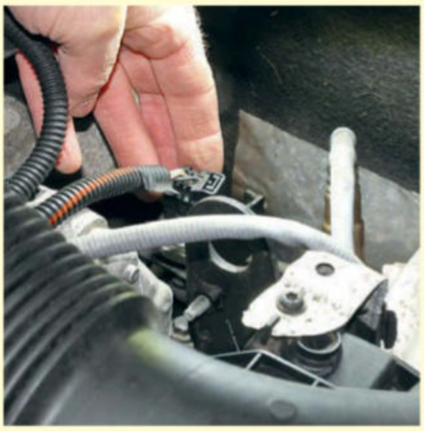
1 There's a fusebox in the nearside rear corner of the engine bay. Release its plastic lid and look inside for signs of water ingress and corrosion, which can result in a multitude of electrical issues.



2 The 12V vehicle battery is also on the nearside of the engine bay, next to the fusebox. Check the battery's terminals are clean and secure. When using diagnostic equipment, connecting a booster pack to the battery will help to reduce the risk of voltage drops and anomalies. Look down the nearside of the battery to an earth point on the bodywork of the vehicle. Make sure it is clean and secure – problems can arise if it's corroded and/or damaged.



3 The exhaust manifold is at the back of the engine bay, and there's an oxygen sensor mounted into the top of it. This is an upstream sensor, with a second one (downstream) further along the exhaust system and accessible from underneath the vehicle.



4 Next to the oxygen sensor outlined in the last step, there's an exhaust manifold back pressure sensor. See *Fault 2* for details on problems that can arise with this sensor.

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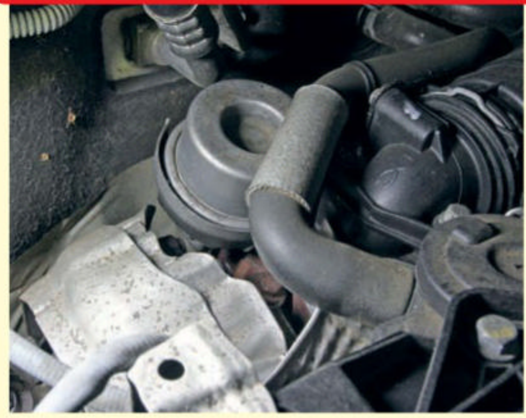
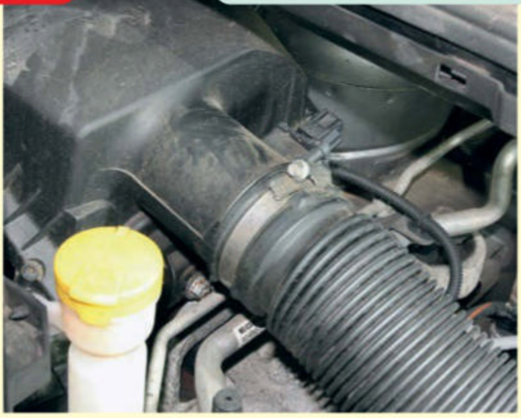
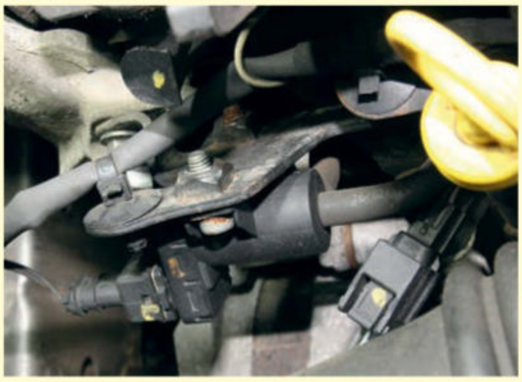
Typical VAUXHALL VIVARO COMPONENTS



5 ◀ **The turbocharger is also accessible from the back of the engine bay and is to the nearside of the oxygen sensor outlined in *Step 3*. This particular engine has one turbo, whereas some Vivaros with the same engine have two.**

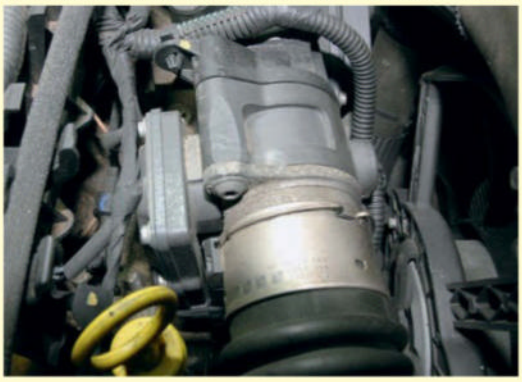
6 ▶ **The air filter housing is on the offside of the engine bay and has a mass airflow (MAF) sensor attached nearby. Mark says he has found this to be reliable. A replacement costs around £125.**

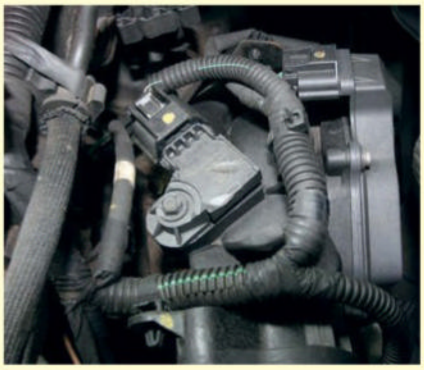




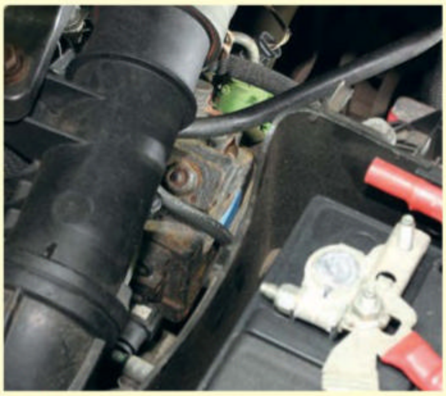
7 ◀ **To the left of the engine oil dipstick, there's a vacuum control valve, which is attached to a bracket on the side of the cylinder-head.**

8 ▶ **To the right of the engine oil dipstick, there's a high-pressure EGR valve. Problems can arise with this component – see *Fault 4*.**

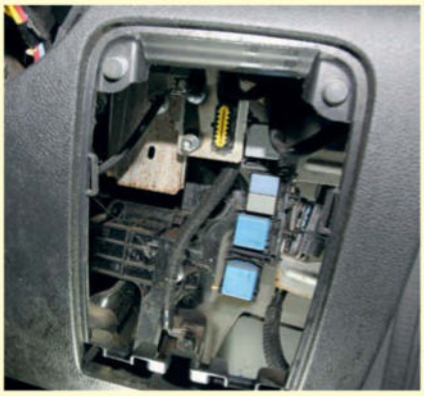




9 **There's a boost pressure sensor next to the high-pressure EGR valve, along with a throttle body underneath, which helps to smooth out engine revs during gear changes.**



10 **Located at the back of the engine and close to the vehicle's 12V battery, there's a vacuum pump, which provides servo assistance for the brakes.**



11 **The EOBD port is on the driver's side of the dashboard. Release a plastic access panel to see a yellow-coloured socket for connecting diagnostic equipment.**

TECHNICAL SPECIFICATIONS

Engine	1598cc 4-cyl twin-cam common-rail diesel
Engine oil grade	0W-30, 0W-40, 5W-30 or 5W-40 fully-synthetic (depending on climate)
Oil classification	Dexos 2, C3
Oil capacity/schedule	7.4 litres with filter every 25,000 miles or 24 months
Brake fluid	DOT 4+
Coolant	GM Longlife (9.5 litres)

TORQUE SETTINGS

Sump drain plug	25Nm
Glow plugs	14Nm
Crankshaft position sensor	10Nm
Camshaft position sensor	10Nm
Road wheels	160Nm

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Typical VAUXHALL VIVARO FAULTS

OIL DILUTION

FAULT 1

▶ The ECU records oil dilution data, which is displayed on the dashboard (known as an oil dilution counter). Mark has found that if the oil is diluted this system prevents the DPF from being regenerated, but the damage is often done, resulting in, for example, wear on the timing chain. With oil services being so long (every 25k or two years), the problem may not be discovered until it's too late.

FORCED DPF REGEN

FAULT 3

▶ When DPF-related issues arise, Mark has found that many owners or mechanics will force a regeneration, which results in further oil dilution (as outlined in the previous fault) and excessive heat that risks melting parts of the DPF. He says that he prefers to remove the DPF and have it cleaned instead of attempting to run a regen.

INDUCTION & EGR SOOT

FAULT 5

▶ A flap inside the exhaust system can stick, resulting in a pipe from this to the low-pressure EGR valve becoming contaminated with exhaust soot. If the DPF fails or there are issues with it, the soot can extend to the induction system and inlet manifold.

STICKING THERMOSTAT

FAULT 7

▶ Mark has discovered the coolant thermostat can stick open, so the temperature of the engine coolant rarely gets above the target 80°C when the DPF can then regenerate. This may sound like good news if there are DPF problems, but he has found that if the coolant temperature occasionally goes above 80°C, then the DPF regen begins, only for it to stop when the temperature drops. The stopping and starting of a DPF regen results in fuel being dumped into the engine oil (dilution).

BLOCKED EXHAUST PRESSURE SENSOR

FAULT 2

▶ The exhaust manifold back pressure sensor outlined in *Step 4* of the previous section has a narrow pipe (roughly the same internal diameter as a brake pipe) routed to the exhaust manifold. Mark has found that this can gradually become blocked with soot from the exhaust, which results in the ECU not being able to calculate the condition of the DPF, so it can get stuck in a constant regeneration cycle of the DPF. This results in oil dilution (see *Fault 1*), wear of the timing chain and damage to the DPF, not to mention high fuel consumption.

STICKING EGR VALVES

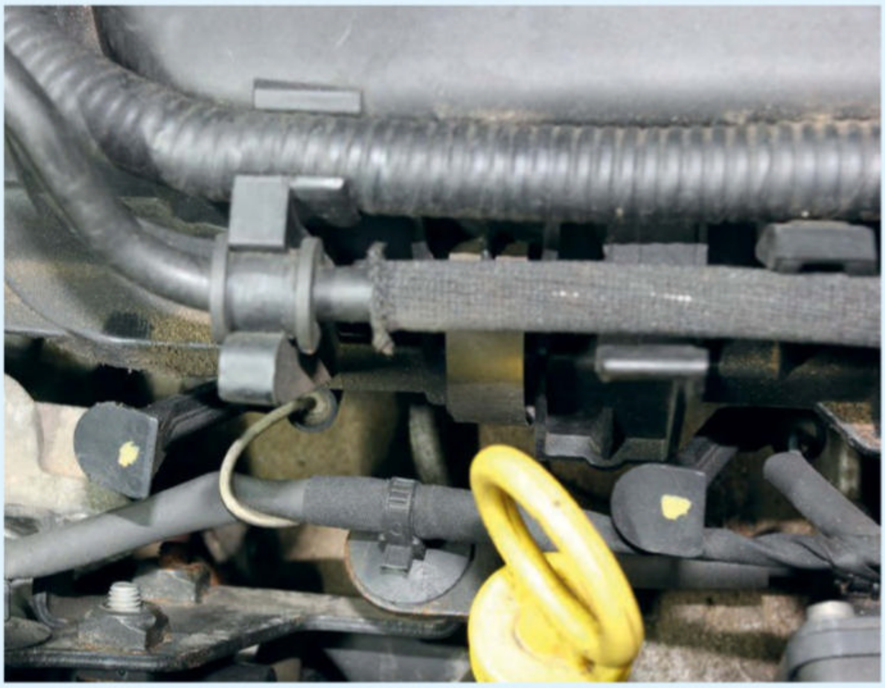
FAULT 4

▶ Oil contamination (dilution) can result in the high- and low-pressure EGR valves sticking and then failing (electronically and mechanically). This adds further problems for the DPF, resulting in it becoming blocked.

GLOW PLUG FAILURE

FAULT 6

▶ The glow plugs are accessible across the front of the engine. Mark has found them to be straightforward to renew and if one or more of them fails, the engine management light permanently appears on the dashboard, so the problem is easy to identify with a fault code reader. If ignored, a failed glow plug prevents the DPF from being regenerated, which results in the aforementioned issues.



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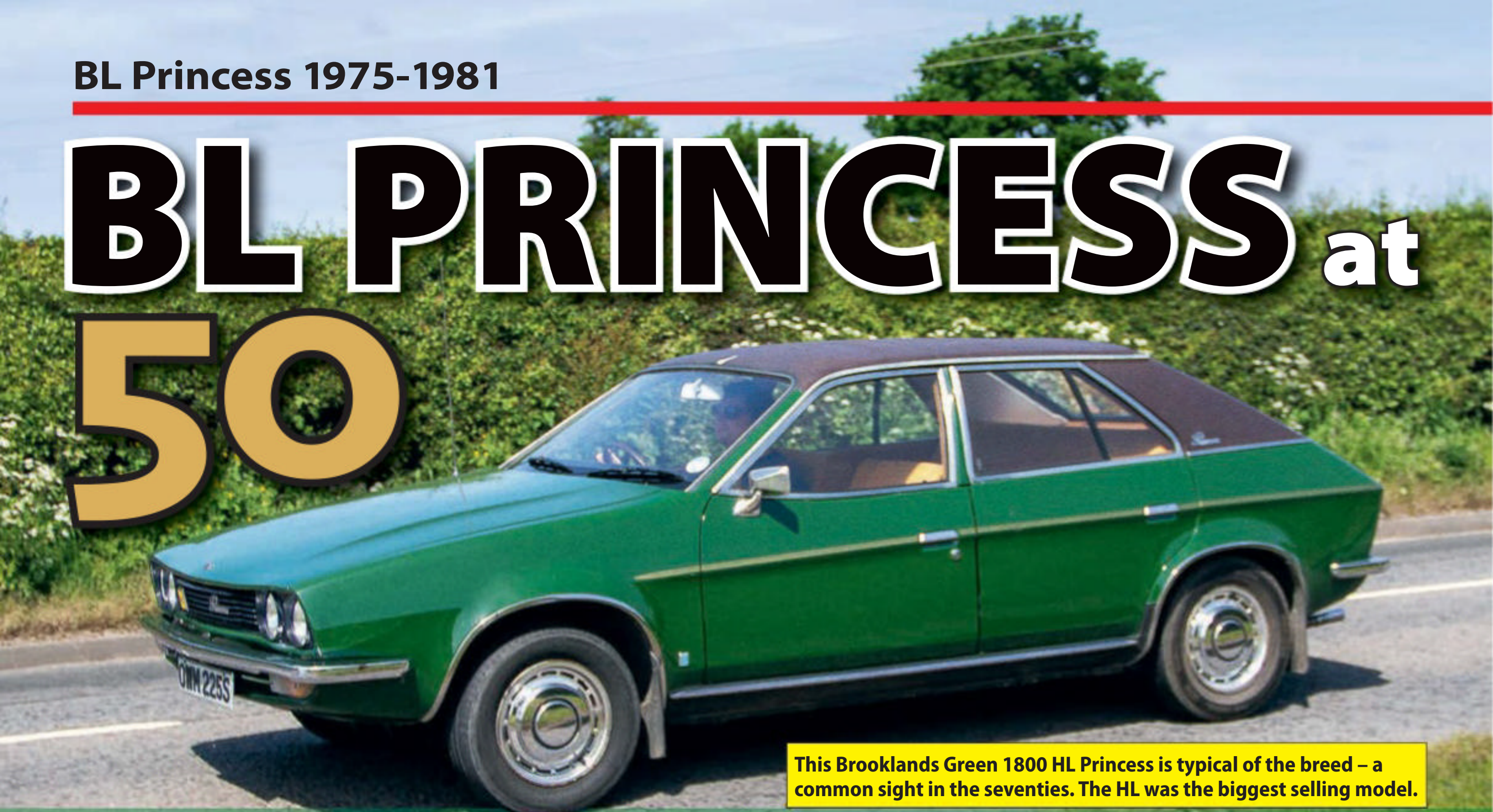
BL PRINCESS at 50



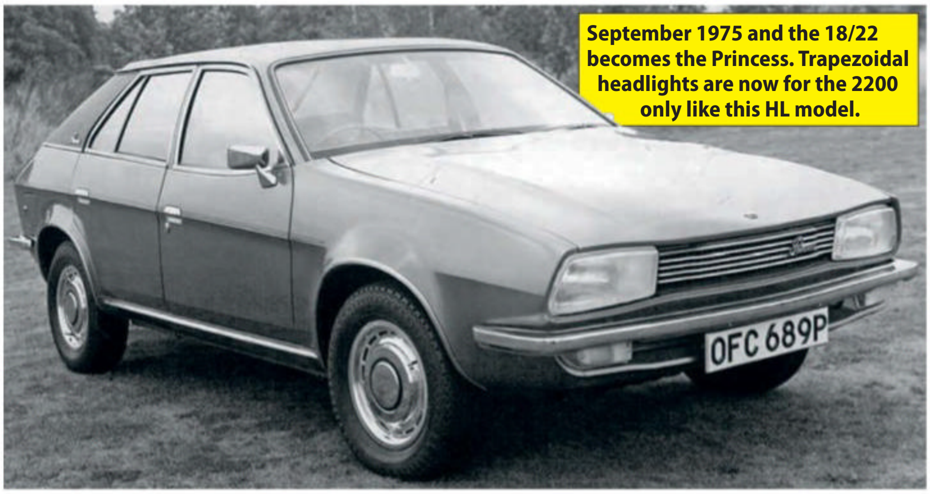
This Brooklands Green 1800 HL Princess is typical of the breed – a common sight in the seventies. The HL was the biggest selling model.

Fifty years ago this month, British Leyland launched the car they hoped would save them. It didn't, but the BL Princess is still worth remembering says Andrew Everett.

As you read this, it's 50 years since British Leyland launched the new Austin Morris 18/22 range with the plush Wolseley as the cherry on the cake. The Harris Mann styled 18/22 launched on March 26th 1975, in Austin and Morris guises with the 1800 B-Series (85bhp) and 2200 OHC six-cylinder 110bhp engines. Morris cars used the humped bonnet and four circular headlights shared with the top Wolseley, whilst Austins used the flat bonnet and large trapezoidal units – which most considered better looking.

Basic 1800 models were joined by an HL package (standard on the 2200) – vinyl trimmed C-pillars, full wheel and arch trims, a clock and ammeter in a silver finish fascia panel, lockable fuel cap and a centre console, along with a fold-down rear armrest and plusher interior featuring seats with perforated vinyl centre sections. Wolseley models added a full vinyl roof, crushed velour seat trim with a wood finish facia, front fold-down armrests, tinted glass and a radio, plus smart finned wheel covers with chrome beauty rings.

Replacing the old 1800 and 2200 (1964-1975), the new 18/22 righted most of the failings – it was certainly more attractive and the new Hydragas suspension improved the ride further. Unlike the Mini, Maxis and Allegro, the 18/22 had no front subframe – the suspension arms bolting to the shell with the Hydragas units sitting horizontally in a huge transverse tube welded to the front bulkhead. To further improve the ride, BL fitted fat 185/70x14 tyres on narrow 4.5in steel wheels with tyre pressures in the mid-twenties.



September 1975 and the 18/22 becomes the Princess. Trapezoidal headlights are now for the 2200 only like this HL model.

Early road tests were positive. The 1800's performance was felt to be very average and the 2200 thirsty. The ride and interior room were rated exceptional with safe handling. Road testers found that this markedly improved by adding 5psi to the tyre pressures and whilst power steering was optional on all but the Wolseley, it was quickly considered a vital option, especially on the 2200 cars – and it was standardised later. But overall, it was a very good car with fresh unusual styling and many good points, but not without room for improvement.

The 18/22 became a Princess in September 1975 following BL's collapse and government bailout, and the rationalising of Austin and Morris dealerships. Out went the Wolseley along with Austin and Morris name tags as well as the odd-looking humped bonnet. In came a new structured Princess range in 1800 base and HL and 2200 HL with a new HLS model to replace the Wolseley with near identical trim and equipment.

Typically for BL though, a string of reliability problems arrived. Shoddy assembly, water leaks, Hydragas unit failure and general BL malaise blighted its reputation. Driveshaft failure of manual gearbox 2200 cars was so chronic that BL dropped it from production for a few months until revised engine mountings to relocate the power unit and reduce the driveshaft angle arrived.

With nothing to lose, BL started on a programme of improvements resulting in the Princess 2, launched in July 1978

This is the pre-production Morris 1800 base model saved from the crusher 30 years ago and completely restored a few years back.

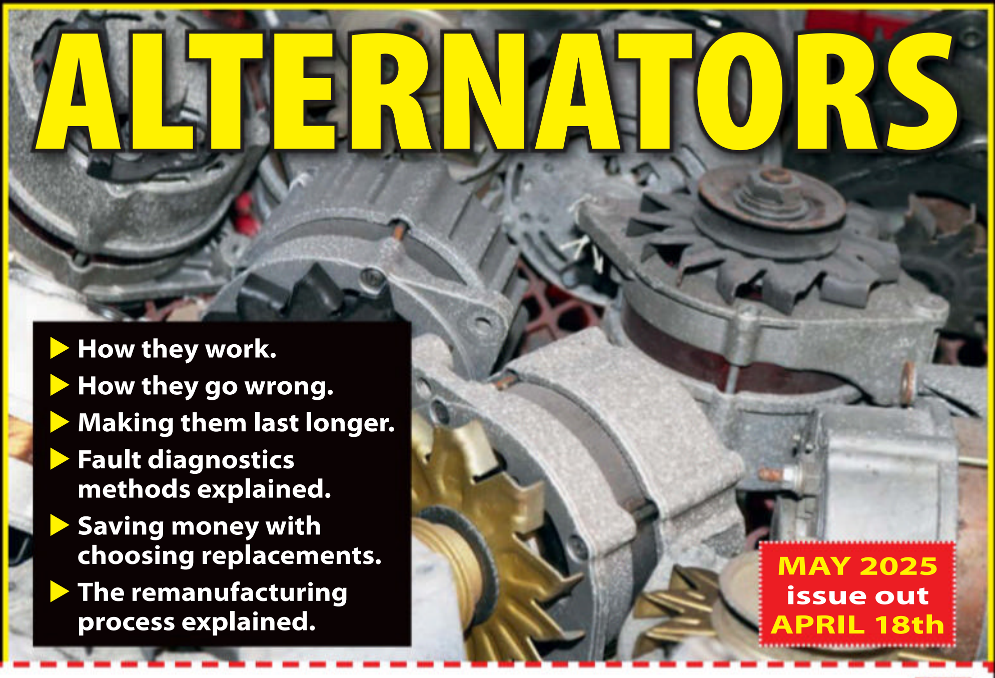
and it's fair to say that this was the car BL should have launched in 1975. The key change was the replacement of the old B-Series with the all-new O-Series in 1700 and 2000 guises with 83 and 93bhp respectively. Based on the basic block dimensions of the B-Series, the O-Series was basically BL's answer to the Ford Pinto – a solid slogger built for reliability, and it was certainly a very strong trouble-free unit. Still using the 1800/2200 four-speed gearbox, the 2000 was notably quicker and certainly made the 2200 a bit superfluous. As well as the new engine, the Princess was generally tidied up. New trim, revised Hydragas units, new circular instruments and some new colours including the glorious Tara green metallic. The base model 1700 was now an L and it was notable to all how much the assembly quality and paint finish had improved. 1700 and 2000 HLS models were added gradually. Sadly, though it was too late to arrest the gradual slide in sales and it was always crucified by the Cortina, Granada and Cavalier, slotting in with cars like the Renault 20 and Vauxhall Carlton, rarely troubling the top ten.

Princess production ended in November 1981, replaced in '82 by the hatchback Ambassador which was basically a heavily-revised Princess. It has most of the Princess good points, but something was lost in character, and the styling hasn't aged well. In the event only the front door skins were used on the Ambassador and BL also dropped the 2200 engine, allowing BL engineers to lower the bonnet line. BL renamed the car to imply that it was an all-new model but like the Morris Ital, buyers were not fooled. Even so, BL shifted 43,000 Ambassadors in two years, though the car was never officially exported or built in left-hand-drive form. The Princess sold 225,000 units in seven years compared to well over a million Cortinas sold in that period.

As a postscript, I rescued two very early examples from the same scrapyard 30 years ago. KJO 350N is a white base Morris 1800 – a running driving car that was quickly passed onto Nick Larkin (motoring journalist) who still owns and cherishes it today. Two weeks later, I rescued YJO 71R from the same yard – a pre-production Morris base model in red, retained by BL for dealer training and sold off in 1977. It too survives in superb, restored condition.

I always try and fight for the underdog and whilst the Princess was ultimately a flawed failure for BL, it has such a unique character with its still-outlandish styling, comfy, loping ride and BL gear whine. There was a great car trying to escape, and it rightly continues to find new fans.

NEXT MONTH



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Our Cars

Peter Simpson

Former Editor

Volvo 240 Estate

Over the past couple of months, I've been making as much use as I can of the new garage/workshop 'facility' to catch up on some overdue maintenance across the car collection. The main recipient of this work has been the Volvo 240 estate – which, rather unkindly, the rest of the family have christened 'Red Lego Brick.'

At present, this car has two key roles. The first is to provide a useful and durable car for domestic duties such as tip runs, car boot sales, collections from DIY Superstores and so on, jobs for which its legendary load-lugging capacity make it pretty-much perfect. But because it's a Volvo, and Volvos of this era were designed to cope with Swedish winter weather, I also use it to satisfy my personal classic driving cravings between October and March when the other old cars are all off the road. In this role it also excels. I don't know of many other 34-year-old cars on which, when the temperatures outside are sub-zero, one must turn the heater DOWN after just 15-20 minutes because the internal temperature is becoming uncomfortably hot!

Anyway, with the new 'facilities' I've been able to give Red Lego Brick (there, they've got me at it now...) an oil, filter and coolant change, and a good general lube-up. Earlier this year I also treated it to a new set of rear brake pads – the fronts were fine.

IN PETER'S GARAGE

1949 Riley RMB Ex-Nick Baldwin, bought May 2024 in good running order.

1955 MG Magnette ZA Bought 2022, renovation nearly finished.

1958 Hillman Minx Owned since 1991 – show car.

1970 Rover P6 3500 Older restoration, found in a garage in 2017. Long-distance classic.

1990 Volvo 240 estate Current *Classics World* magazine project car.

1992 Rover 827 Coupe Low-mileage original car with working aircon!

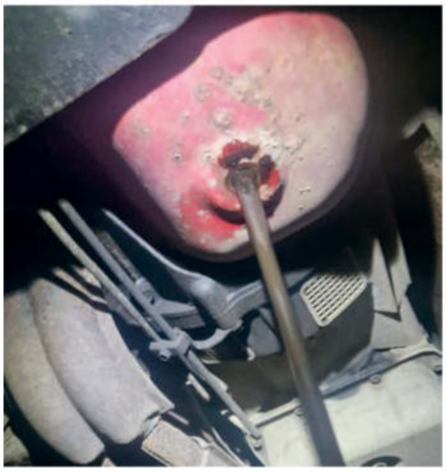
2011 Volvo C70 Coupe Peter's everyday car will eventually join classic fleet.

2014 Kia Sorento Family hack/truck that's always there and never lets us down.

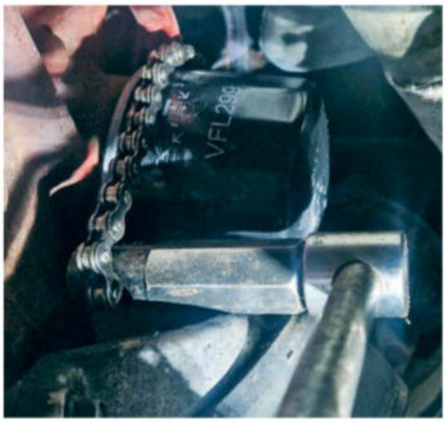
The oil filter change is straightforward enough – if you do it from underneath rather than trying to get in from on top – febi bilstein provided a good-quality oil filter, air filter and, of course, the all-important 4.5 litres of 5W/30. One interesting thing that I noticed during the swap; with the sump drained, when I took the oil filter off next, no further oil came out.

Use a socket and extension

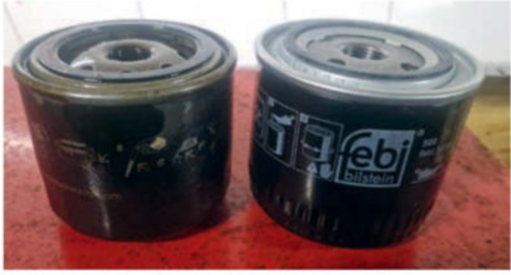
The coolant change also passed without incident. Tip here, genuine Jubilee worm drive clips and some other good quality ones have flats on their screwhead so you can use a socket and extension instead of a screwdriver – better grip and a lot more leverage. If you suspect this might be needed it's usually best to go straight to the socket – a screwdriver risks chewing the head so a socket won't go on. As usual with older cars, the Volvo requires old-school blue glycol-based antifreeze – not a modern OAT type one which can cause leaks and other issues in cars not



Draining the engine oil. The sump plug requires a 26mm socket to undo along with, in my case, a 24in breaker bar.



Volvo 240 oil filter change is possible from up top, but a lot easier if you can get underneath. My trusty Sykes-Pickavant filter removal tool has done battle many times on my behalf, but this was actually one of its easier victories.



Old and new filters compared. It's worth taking a minute or three to check things like height and hole size before going under to fit the new ones; parts do sometimes end up in the wrong boxes, and trying to fit something that will never go on is time-consuming and frustrating.

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Red Lego Brick doing sterling service as a car boot barge – one of the jobs it was bought to undertake. Sadly, the T-Cut induced shine seen was short-lived and faded after a few months.

Refilling – I'm a bit clumsy when it comes to pouring liquids through a hole, and a 99p plastic funnel saves a lot of mess.

New antifreeze every two years is recommended – as well as protecting against frozen water damage, good antifreeze helps prevent waterway corrosion. Draining the system involves undoing the bottom hose clip and pulling the hose off.

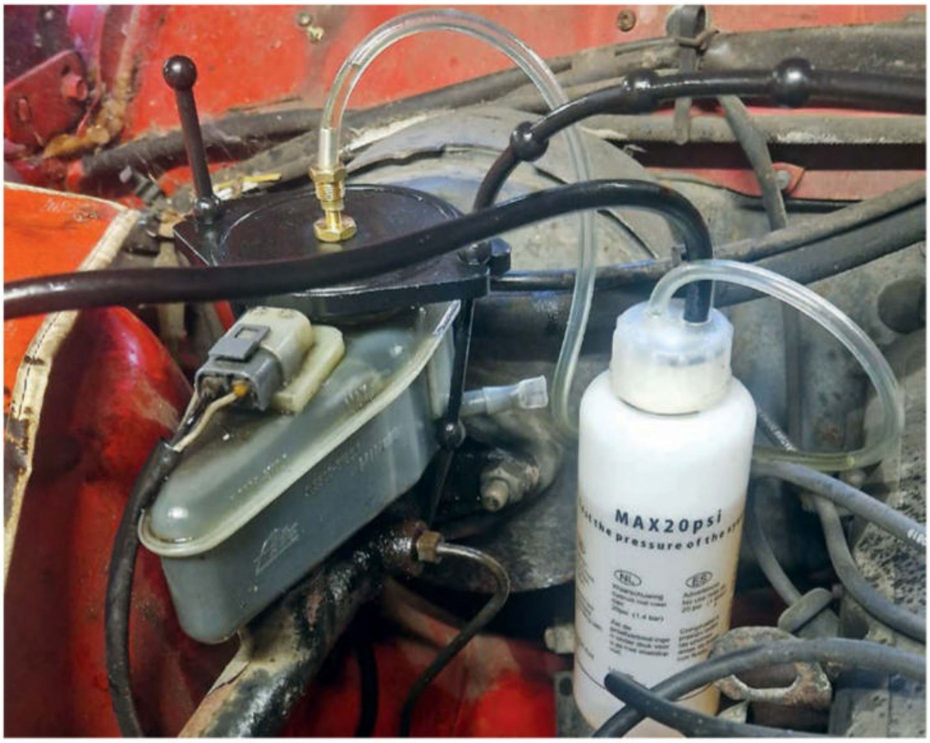
designed for it. I generally use a 50/50 water/antifreeze mix and, because I like to choose my own mix-concentration, I always buy anti-freeze in concentrated, rather than ready-mixed, form.

I also tried to change the brake fluid, though unfortunately there was a snag which prevented me from doing so. To assist, I obtained a Gunson Eeezibleed – something I'm sure most older readers will be familiar with as it's been around for ages. I bought my first one in the 1980s and it was used extensively over the ensuing quarter century – in fact I worked it to death. These days, Gunson is part of The Tool Connection group alongside Laser Tools and Kamasa, and while the Gunson range itself has expanded somewhat, Eezibleed is basically the same as it always was; it still works, so why change it?

Actually, there is one minor change; because these days master cylinder caps come in all shapes and sizes, Gunson supply, as an extra, a universal connector which will fit any size cylinder. It secures by means of a stretchable rubber strap, which passes right round the cylinder. You must, though, follow the instructions and reduce the pressure within the tyre being used to power the system to a maximum of 20psi, or 10psi if you're dealing with a classic. This last bit is vital otherwise you'll probably cover the engine bay in brake fluid. And brake fluid is of course extremely effective at stripping paint.

I got the thing connected up fine. Unfortunately, however, I can't yet tell you how good the current Eezibleed is at pushing brake fluid through, because when I went to slacken off the first bleed nipple, it sheared off due to being rusted into the caliper. So, the caliper will have to come off so I can drill it out. Alternatively, as the rear calipers look quite rusty overall, it may be better to just renew them. We will see.

Talking of corrosion… Having access to a hoist also meant that I could give the underbody a good look-over, and while the bodyshell is as solid as you'd expect a Volvo to be, I was slightly perturbed by the amount of surface corrosion on both front lower wishbones! This isn't yet at the point where structural integrity is being threatened, but all the same, I'm thinking it might be wise to renew these now. So, I will order a pair from febi and I'll show you how fitting them went next time. Along with whatever I decide to do about the rear brakes.



Gunson Eezibleed's 2025 incarnation in action, with the optional universal connector – the basic kit actually contains a cap that fits a Volvo 240, but I wanted to show you how the newer connector works. This is as far as I got though, as the first bleed nipple I tried to open was rusted in and sheared off when I tried to turn it.

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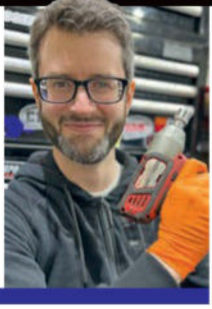
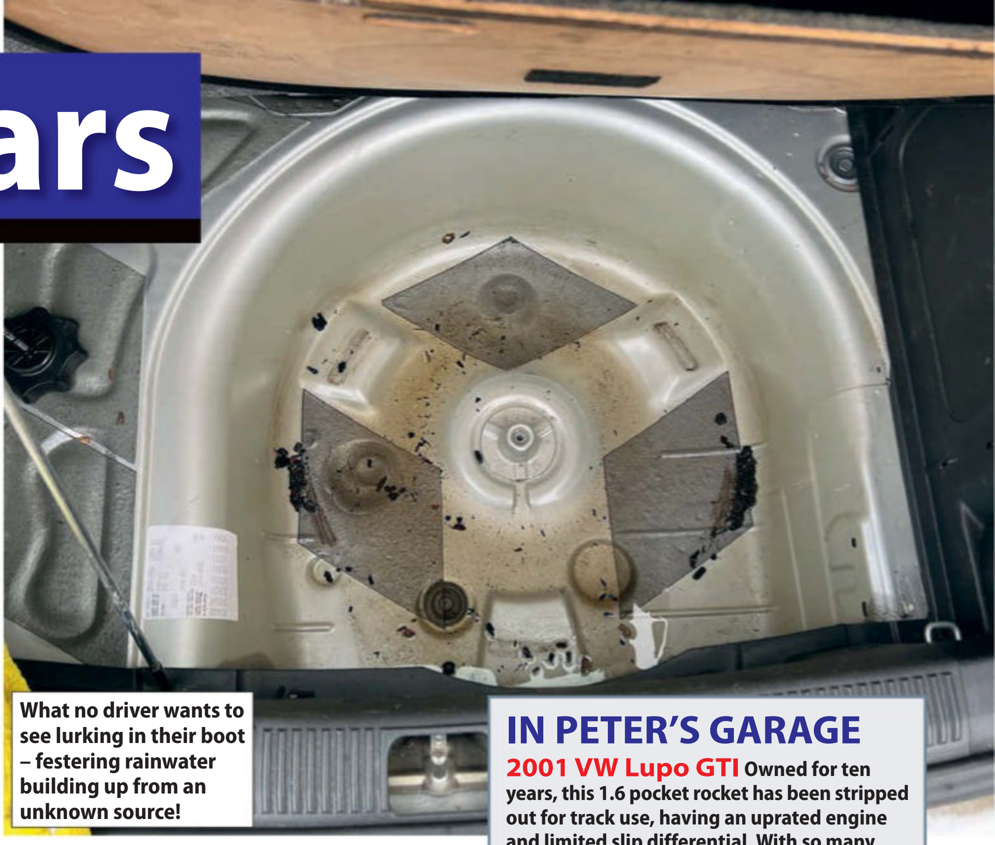


Peter Clayton

Special Contributor

Seal repair

I've had a niggly issue with my 2013 Skoda Fabia 1.2 MkII hatchback for the past year. It first came to light when I began to smell stale water in the cabin and the interior windows would mist up. I was quite familiar with the symptoms because my old Fabia MkI did the same. On that older model the lame inner door panel seals wouldn't stop rainwater coming in if their lives depended on it. So, water would build up on the front carpets and rear seats as a result. The fix was to take all interior door panels off and lay a good bead of sealant along the failed seals in the metal inner door panels. When I checked the floors and rear seats on the Fabia MkII however, all were bone dry. Lifting the boot floor revealed where the water was sitting – in the spare wheel well.



What no driver wants to see lurking in their boot – festering rainwater building up from an unknown source!

Finding the source

After drying up the wheel well I had to find the route that water was taking, which was more difficult than I thought as I couldn't see any water trails. I did see two gromets in the boot well area that led to the rear bumper. I assumed these were for electrical ancillary purposes such as the conduit for reverse sensor wiring. As my Fabia didn't have such fanciful things, the gromets should have just sealed the holes off. To be 100% sure I popped out the gromets and smeared some polyurethane sealant and refitted them. I then laid a couple of dry microfibre cloths either corner of the boot under the carpet and waited for rain (which didn't take too long).

Annoyingly the cloth to the offside still became wet after a long drive in the rain. Over the coming months I became used to replacing the cloths in that area every few weeks to avoid a lake forming in the wheel well. There was only so much nappy changing I could take and had to find the route cause. The only other area which can sometimes fail on the Fabia is the air pressure equalisation vents in the body behind the bumper. I had been waiting for a dry day to get this job sorted, but it's one of the easiest tasks even a beginner DIY mechanic can have a crack at.

IN PETER'S GARAGE

2001 VW Lupo GTI Owned for ten years, this 1.6 pocket rocket has been stripped out for track use, having an uprated engine and limited slip differential. With so many hours of work on it I'm now reluctant to race it!

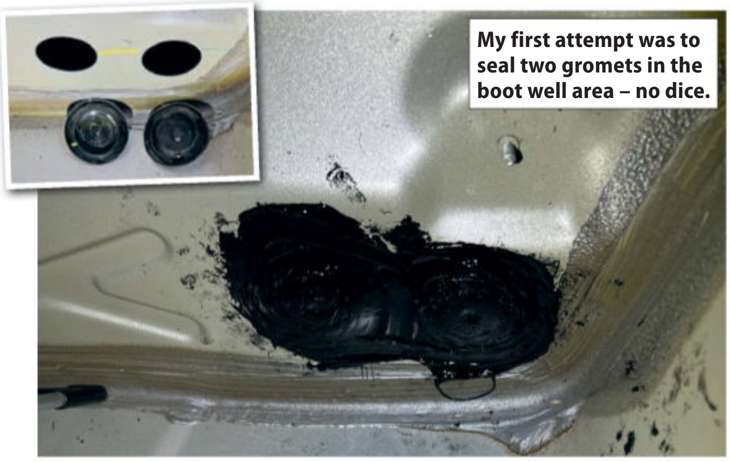
2006 MINI One R50 Owned from new, this 1.6 Pepper Pack version handles amazingly well – the CVT autobox slightly tarnishes the experience. The better half's daily drive and she won't part with it.

2006 E87 BMW 130i My second summer toy – in M-Sport guise I think is quite a handsome thing with plenty of performance (and typical BMW niggles!)

2013 Skoda Fabia My daily commuter, just enough pep from the 1.2 to get to motorway speeds. Has been the most reliable car I've owned.

Bumper removal

To whip off the bumper first requires the wheelarch liners to be removed. However, you can get away with unscrewing the first four or five T25 liner screws and carefully prising the plastic away. On mine I ended up removing the road wheel for better



My first attempt was to seal two gromets in the boot well area – no dice.

Laying down some cloths either side allowed me to track where the water was coming from and helped absorb the ingress.

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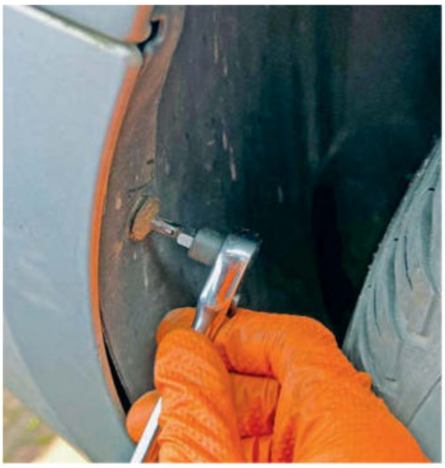
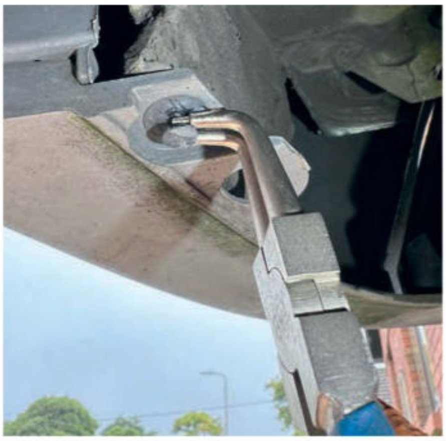


Undoing the Torx screws in the arch liner, followed by the bumper screw behind it.



I didn't have the right tool to pull out the inner section of these plastic expanding rivets, but my circlip pliers managed to pull out the pin.

access and it allowed me to contort the liner further. Some of the screws can succumb to the elements, but febi offer replacements under part number 38699 (mine weren't too bad luckily). Once the liner is pulled back from the bumper slightly there is another T25 screw which holds the corner of the bumper in place. With those removed either side there are two plastic expanding rivets under the car which hold the bottom of the bumper cover to the body. On some variants there may be a few screws to undo here.

Back on the top side, the rear lights must be manoeuvred out of their seated position. Simply open the boot lid and you will see a circular plastic knob behind each light cluster to undo. With this removed the units will pull outwards with a light tug. With the lamps hanging carefully by the wiring you can now access two T30 screws holding the bumper cover on to the body. With these undone it's best to lightly screw back in the lamps so they don't flail about.

Lastly, tug the bumper cover edges away from the arches at 90°, ie. don't pull the bumper directly back. It should unclip on both sides, which will then allow you to tilt the bumper cover up and away from the car. Having limited space, I placed the bumper cover on my lawn to ensure the paintwork wouldn't get scuffed. The vents should now be easily visible either side.

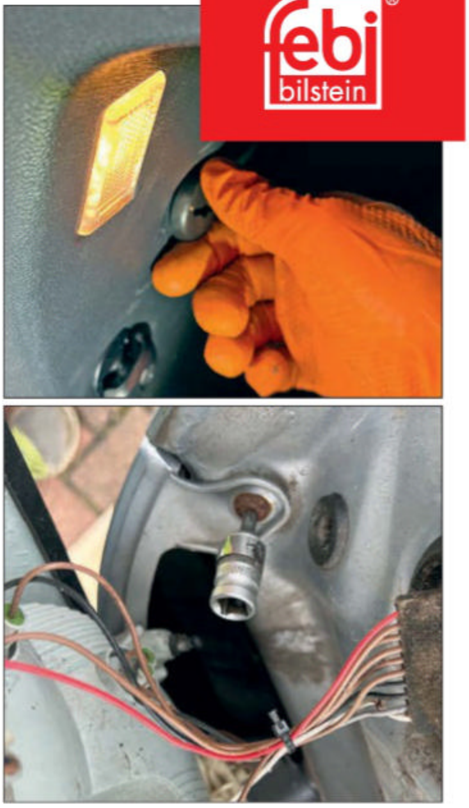
Vent seals

Each vent should have a protective plastic cover at the top. I assume to divert rainwater away from the vent. If the sealing at the top of this area should fail, then water will ingress to the boot area. Rather than just dollop some sealant on the top I took the time to dismantle the vents, cleaning them up carefully before then squeezing some polyurethane sealant along the top and edges (my weapon of choice is PU18 by bond it). The plastic cover has two tabs either side that can be lifted carefully, then the whole cover can be slid up and off. The vents I found just needed a wiggle, squeeze either side and a stiff yank to pull them out of the boot apertures.

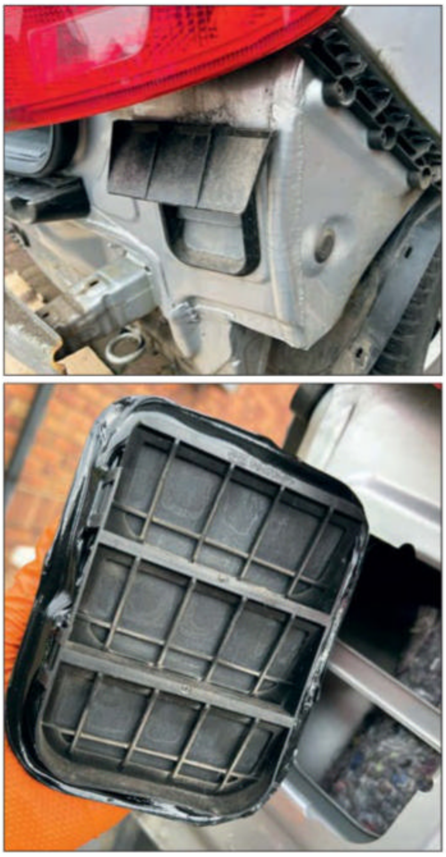
A clean with a toothbrush and spray of isopropyl alcohol later saw the vents back to showroom condition. I also cleaned up the perimeter of the vent apertures as this is where the sealant would stick to. A fine bead was laid around the edge of the sealing surface of the vent before it was clipped back into position. I also put some sealant on the mating surfaces of the plastic cover before sliding that back into place.

I managed to get the bumper cover back on single-handedly, but having a second person/reluctant wife to help does make it a bit easier. First, tilt the bumper cover forward so that the top edge fits under the lower boot seal, then tilt backwards and push into place. Each side of the cover will need manipulating slightly until they click back into their plastic catches each side. I found a light thump with the side of my fist worked well enough! All the screws can then be refitted.

I gave the body a good clean where the lamps fitted as there are seals here that could potentially allow water to come into the cabin. The lamps were then aligned with the fitting lugs and the plastic screw inside the boot was refitted hand tight. With the liners repositioned and secured that was the job done! I placed a fresh set of dry cloths in the boot so I can monitor how the fix went. Let's hope they stay dry permanently!



With the rear lamp undone from the inside of the boot, the remaining bumper cover T30 screws are revealed.



The plastic cover and vent are then removed from the body and sealed up before being clipped back in.

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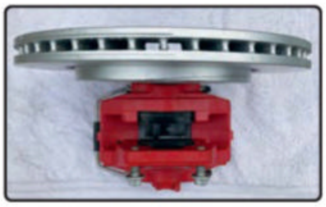

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In my Humble Opinion

As you read this, Vauxhall production will be finally ending in Luton. So, I share with you a cozy Vauxhall tale from a good few years back.

Cars we love to hate (part 1)

▶ The poor old Vauxhall Vectra, one of the UKs most lambasted cars. All a bit unfair really as I have had nothing but positive experiences with them. Had GM named it as the all new Mk4 Cavalier, they would have had another winner.

I will go on record and say that I found the Vectra a good grafter, bereft of any style, substance or class; but a well-serviced and cared for 1.8 will plod on with the same determination and dogged stamina of a 10-year-old Clydesdale. The last Vectra I owned was a 2001 Club 1.8 that I took as a trade-in during my time selling new cars. It racked up the thick end of 9000 miles in little under three months with the 'other half' commuting between Durham and Sussex just prior to our re-location. The damn thing was bought for shirt buttons and didn't put so much as a foot wrong.

A good time back, I remember receiving a telephone call from a 'rival' mobile mechanic – a rare turn of events – in Yarm (about eight miles away) and he enquired if I wished to take on one of his jobs at short notice owing to retirement. It soon became rather obvious that, if he had a brain, he'd be classed as a liability. The job involved was a head gasket on a 1999 Vectra GLS. He suggested that the customer should contact me directly and, owing to my workload being a touch sparse, I agreed, and awaited a call from a Mr or Mrs Hurst. The phone rang a short while later and I chatted to a lovely sounding lady who described the symptoms over the line which did not tally with a blown head gasket. She also let slip that her husband thought mechanic 'A' was nothing short of useless and was tempted to find someone else – oh dear. Luckily, she worked in Darlington and could leave the car with me and hitch a ride home with a colleague so I could take (within reason) as long as I needed. Arriving home from a nearby job the morning after, an immaculate Vectra was sitting on the drive – game on!

Finger diagnosis

After checking the oil and water, there was no sign of any head issue, and this was confirmed again after completing a pressure test on this average mileage engine. After coming off the 'phone the previous day, I had kind of diagnosed the fault mentally with a 95% certainty but the aforementioned purely acted as a precautionary measure. Running my finger behind the alloy exhaust manifold heat deflector plate of the cooling engine, grey sooty deposits were left on my paws. Many of you in reader land with a touch of knowledge will be saying to yourself, "ah! – cracked manifold" – which it was.

The 16-valve Ecotec engine features a part which the trade call a 'manicat', whereby the catalytic converter and exhaust manifold are all in one. The engines were quite prone to the cracking of said converter between the branches – that's, in part, thanks to intense heat and poor-quality castings. The symptoms are a rough-sounding engine with a spitting or machine gun-like noise from the extreme front of the engine, which quietens down quickly as the manifold heats through. I contacted the lady to get the go-ahead on a stripdown and, in next to no time, the downpipe was detached, and the exhaust manifold came off with no nasty sheared threads or rounded nuts. There, for all to see between the branches of cylinders one and two, was a hairline crack about an inch long and quite accessible, too. A good job, as the motor factors nearly caused me to faint with the cost of a pattern fit replacement – it was a hell of a lot of money even with 15% trade discount – £250 plus.

I ended up calling some chap who fabricated and welded from a small unit on a local trading estate, who asked if he could see the manifold. About 20 minutes later my Corsavan took me to what at first seemed like the original black hole of Calcutta, where a dirty man in burned overalls gracefully slid out from underneath a Ford Cargo horsebox on a homemade crawler board. Removing his goggles to reveal the only white skin on his person, he re-lit his roll up, looked at the manifold and told me to clean up the crack, drill two roots and come back with £15 – and back under the truck he went.

For those of you not blessed in the art of cobbling a solution or fettling, drilling a root refers to drilling a tiny hole at either end of the crack so when it is welded thoroughly, the crack won't run. My trusty Dremel ground back the surface crud, two holes were drilled into the iron manifold, and, within that very hour, I handed over what was required and sauntered off to grab a plastic cup of tea from a nearby greasy spoon. I must have been gone all of 20 minutes and when I returned the guy was again, back under the truck welding away. He just bellowed from my feet "over there on the bench" and that was it – transaction completed.

Asked what the life expectancy of the repair would be, he snorted "longer than the f*****g car pal", and I kind of went along with his 'hewn from stone' warranty and sourced a couple of gaskets to commence the replacement of the manifold. Just in time for Countdown (the late afternoon televisual treat for the self-employed), the Vectra was perfect. The customer was duly contacted, nicely surprised and slightly taken aback considering the original mechanic has quoted in the region of £600 – my bill came in at a round £125 and everyone was happy.

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